

# Coal Age

DECEMBER, 1956

A McGRAW-HILL PUBLICATION

PRICE 50 CENTS



## ▲ Augering 24-In. Coal

Walton Sudduth Co. produces 150 tpd  
using trucks for overnight storage p54

## ◀ Belt Haulage Control

Hampton No. 3 uses sequence controls  
to monitor its transport system p50





**"Talk up" increased  
production—greater  
safety...with these**  
**M - S - A**  
.....  
**COMMUNICATION**  
.....  
**SYSTEMS**

#### M-S-A MINEPHONE

Dispatcher sends orders instantly and simultaneously to all motormen with this modern, underground two-way voice communication system. Motormen receive and reply while trips are in motion—keep haulage movements coordinated with production demands. This results in smoother, faster, and more continuous trip movements throughout the mine.

Messages clear tracks for outgoing loaded trips and incoming empties. This system puts an end to traffic tie-ups, errors and accidents; prevents excessive stop-and-start strain on equipment. Write for more detailed information.



• Dispatcher sends orders to motormen . . . routes right-of-way traffic . . . receives reports on positions and station conditions.

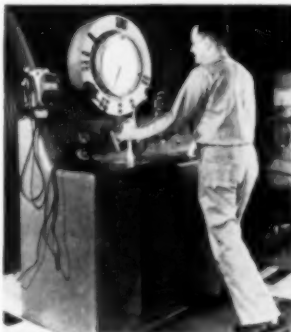


• "Jeep" operator requests instructions from dispatcher and maintenance shop for section assignment . . . speeds emergency repair.

#### M-S-A HOISTPHONE

For accurate, instant response between the hoisting engineer and cage, here's the voice communication system to install. Whatever the job—load leveling—shaft repairs—shaft inspection trips—passenger transportation—the M-S-A Hoist-Phone provides better safety and efficiency through dependable, continuous two-way voice communication at any level, and while the cage is in motion.

Requires no special training . . . simple to use . . . dependable in operation. Write for further information.



• The hoisting engineer is able to control all movements of the cage by communicating with cage rider over the M-S-A HoistPhone.



• Worker uses microphone in cage to tell the hoisting engineer where he wants to go. Loudspeaker mounted on top of cage.



*When you have a safety problem, M-S-A is at your service . . .  
our job is to help you*

#### MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pa.

At Your Service: 77 Branch Offices in the United States and Mexico

#### MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

# B.F. Goodrich



## Belt shovels 1100 tons of coal an hour

**I**T takes hundreds of tons of coal an hour to feed the boilers in this Ohio Valley power plant. But it's a long, steep climb from the storage pile up to the bunkers, so an unusually strong conveyor belt was needed.

B. F. Goodrich engineers recommended a belt made with B. F. Goodrich Nyfil fabrics. In this belt, nylon is used as cross threads in the fabric to give extra strength without adding weight. Use of nylon increases flexibility, so belt troughs perfectly whether empty, lightly or fully loaded. Belts made with Nyfil fabrics hold fasteners better, have greater impact resistance, can carry heavier loads farther, higher, than belts

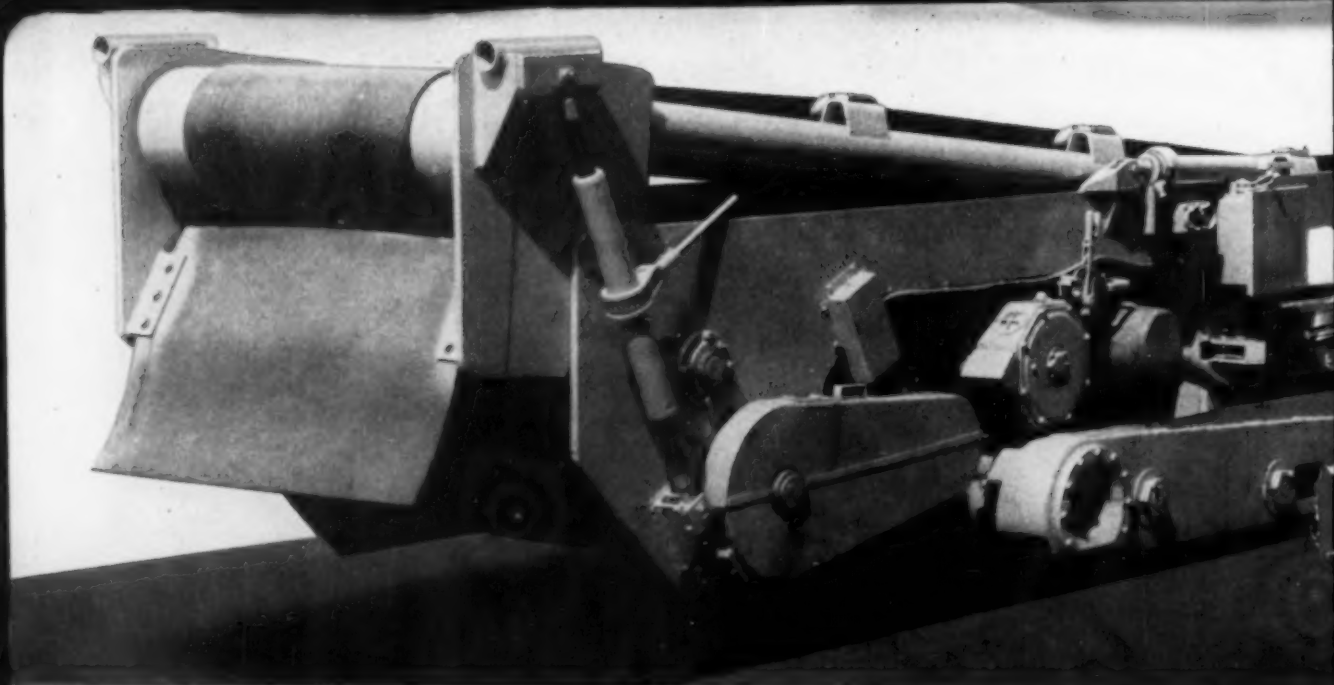
made with all-cotton fabrics, yet these longer-lasting belts cost no more.

As a safety measure, B. F. Goodrich built this belt with a new fire-resisting rubber which will not support combustion or spread fire. B. F. Goodrich belts, made with this rubber, have been accepted for listing as fire resistant by the Bureau of Mines. This special rubber also has high resistance to impact, abrasion, oil, grease, tearing, gouging and even mildew attack. So belts made with it can be expected to equal or surpass the long service records made by other B. F. Goodrich coal-handling belts.

Before you buy another conveyor belt, look into the cost-saving advan-

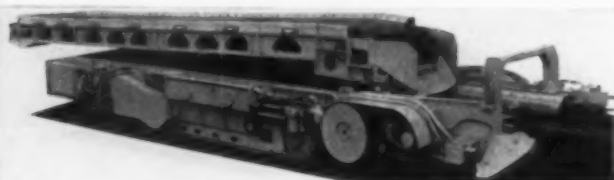
tages you get with a belt made with Nyfil fabrics, and the safety you can get with B. F. Goodrich fire-resisting rubber. Your B. F. Goodrich distributor can give you full details, or write B. F. Goodrich Industrial Products Co., Dept. M-801, Akron 18, Ohio.

**B.F. Goodrich**  
**INDUSTRIAL PRODUCTS**



21668

# The NEW Goodman ROPEX<sup>®</sup>



21678

Patents Pending

Bridge conveyor between tread mounted tail section and continuous miner swivels to right or left, has 13 1/2-foot range of forward and back travel. Hydraulic driven drums on tail section store wire ropes that support carrying idlers.

● Ropex is an extensible belt conveyor equipped with tread-mounted, motor-driven head and tail sections. The head section carries an ingenious arrangement of spools for belt storage. The tail section is equipped with winding drums for wire rope storage.

● Ropex has no fixed structural framing . . . no rigid idler assemblies. Instead, parallel wire ropes carry chain-linked idlers over which the belt travels.

● Ropex is flexible . . . resilient. The wire ropes and hinged idlers "give" in accordance with the weight carried. The load rides smoothly, evenly, with nothing to cause shifting or spilling. At the same time, impact shock on bearings and belt is reduced to a minimum.

● Ropex is available for 48" and 72" seams and can be extended up to 1000 feet in length. Pre-determined tension on both belt and wire ropes is automatically maintained during extension or retraction, loaded or unloaded.

## NOTE THESE GOODMAN "FIRSTS"

- Goodman was first with the Rope Belt Conveyor, now widely used in coal and ore mines. Ropex is a development of this idea with the added feature of extensibility.
- Ropex is the first 36" width extensible belt conveyor in operation.
- Ropex is the first extensible belt conveyor with the capacity to handle the output of a Goodman Continuous Borer (8 to 10 tons per minute) or any other continuous mining machine.

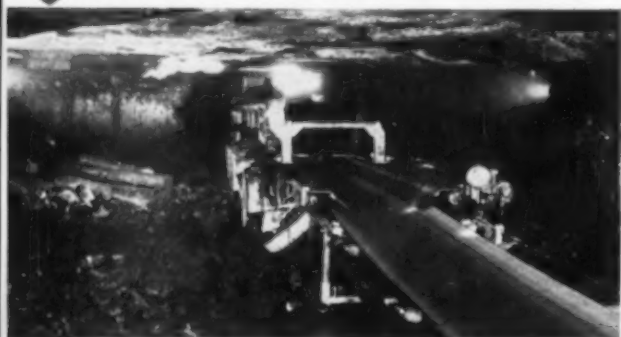
● Ropex is the first extensible belt conveyor to provide for as much as 200 feet of belt storage in the head section for 100-foot extension without interruption to the continuous flow of coal.

● Ropex is the first extensible belt conveyor with open type belt storage.

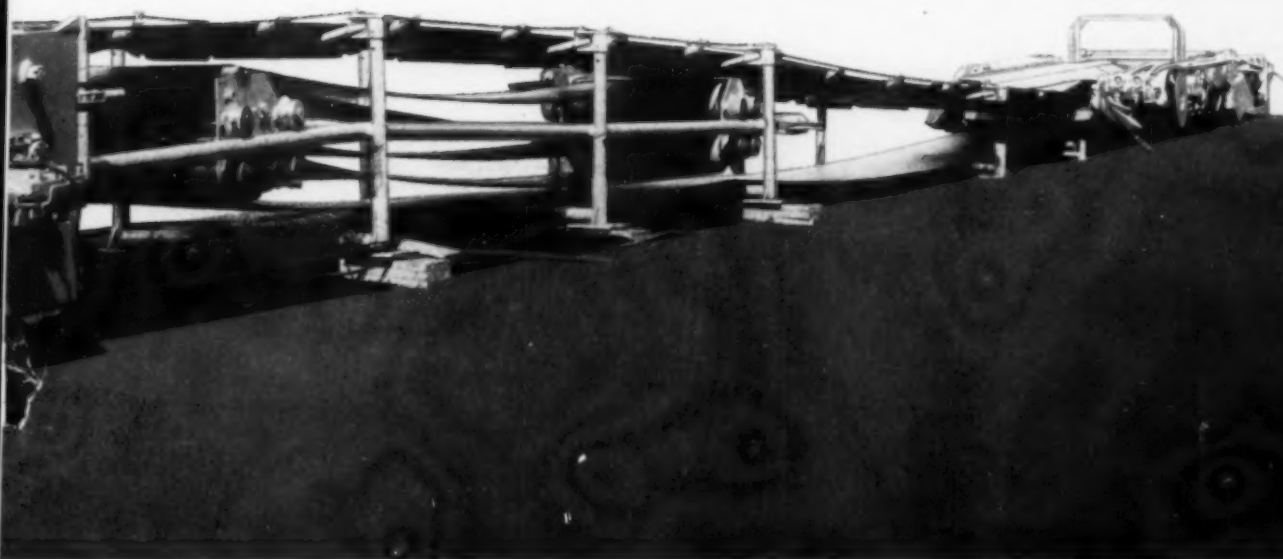
● Ropex is the first extensible belt conveyor with adjustable height discharge.

With Ropex there is no rigid assembly along the belt line. Parts are few, lightweight, easy to handle and store. Labor for moving, installing and extending is reduced.

Patents Pending



Belt to permit extension of Ropex is stored in framework attached to tread mounted head section. Open construction eases task of adding belt, permits ready inspection, provides rub-free belt travel. Provisions available for storage of as much as 200 feet of belt. Spools that carry belt store compactly in head section when unit is moved.



Patented and Patents Pending

# *Extensible Belt Conveyor*

*moves coal from the face as fast as it can be mined  
by any Continuous Miner*

Here is a fast, high capacity conveyor that actually extends itself . . . increases its own length . . . under its own power. It advances as the Continuous Miner advances . . . keeps pace with the face . . . eliminates delays and interruptions . . . provides a continuous flow of coal back to the out-of-mine transportation system.

The Goodman Ropex Conveyor is linked to a continuous mining machine by means of an independent motor driven bridge conveyor with a 13½-foot range of travel. As the mining machine advances to the limit of this range, the tail section of the Ropex Conveyor is trammed forward. Belting and wire rope pay-off automatically. Supporting stands and idler assemblies are added along the line as needed. Meanwhile the mining machine keeps right on cutting. The flow of coal need not stop for a moment during a

full 100-foot advance. At that point a new section of belting is easily added and continuous operation is resumed.

The efficiency and smooth, continuous operation of the Goodman Ropex Conveyor have been thoroughly tested and proved. Now this most modern of all mining equipment is ready to serve you. Let us give you the story in full detail. Write, wire or phone today.

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**GOODMAN**  
MANUFACTURING COMPANY  
Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS  
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

*Use Genuine Goodman Replacement Parts*

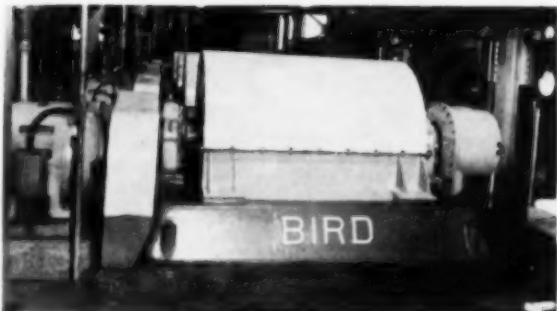
# WHY BIRD COAL FILTERS ARE BEING USED TO DRY MILLIONS OF TONS OF FINE COAL

The reasons for the widespread acceptance of Bird Coal Filters in preparation plants are clearly written in their records of *cost* and *performance*.

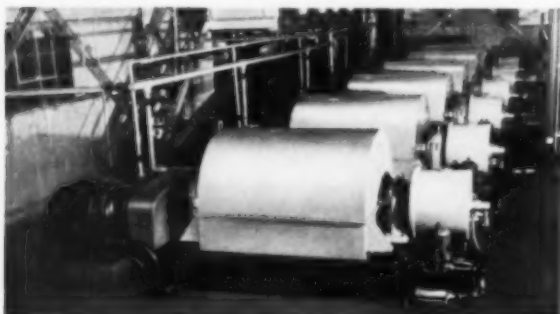
The Bird Coal Filter delivers the dewatered dried coal at the *lowest cost per ton*. This has been proved in the field, time and again.

In some modern preparation plants the fine coal is classified ahead of the tables or jigs to remove the minus 200 mesh slimes before the coal is fed to the Birds. Exceptionally dry coal results — averaging about 7% surface moisture.

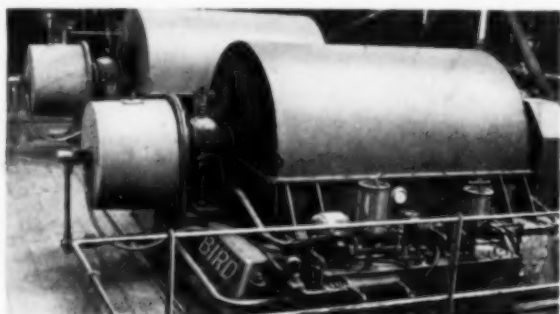
Get the facts and figures on Bird Coal Filters whether you wash 100 tons or less per hour — or 2,000 tons or more.



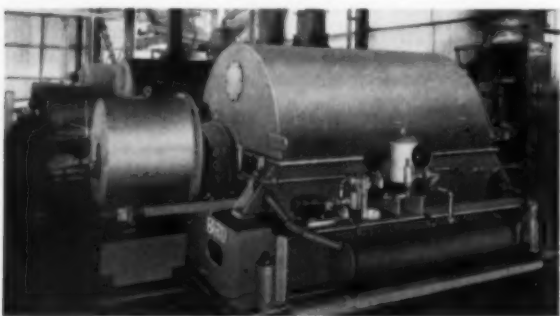
**BIRDS** deliver up to a ton or more of  $\frac{3}{8}$ " x 0 coal per Filter per minute.



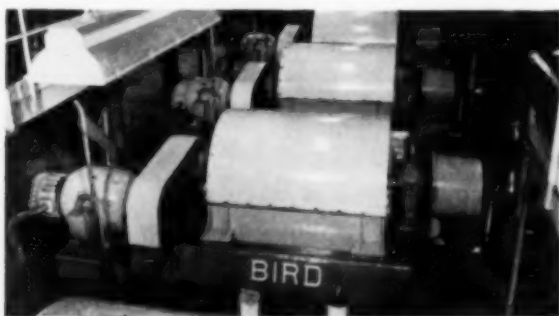
**BIRDS** get the coal as dry as can be obtained by any mechanical means.



**BIRDS** run non-stop for months without replacement of worn parts.



**BIRDS** cost only five or six cents per ton to operate, counting everything — a penny or less per ton for maintenance.



**BIRDS** do the complete job. They handle dilute feeds and recover all the salable coal there is in the feed.

**BIRD**  
MACHINE COMPANY

LEADING AUTHORITY ON SOLIDS-LIQUIDS SEPARATIONS  
Builders of  
SOLIDS-LIQUIDS SEPARATING EQUIPMENT  
SOUTH WALPOLE MASSACHUSETTS  
Regional Offices: Everett, Wash. • Portland, Oregon



## Trends

### In Mining . . .

• Continuous assessment of trends and developments in mining, preparation and supporting services is a key activity of the *Coal Age* staff. The goal is the content of each issue of maximum value to coal-mining men. In fact, the editors aim to anticipate trends and developments and adjust content accordingly. In underground mining in the next 12 mo or so, therefore, *Coal Age* will be emphasizing continuous mining and particularly the role of transportation in raising the productivity of continuous machines.

### In Stripping . . .

• Super shovels, trucks and drills are the biggest outward evidence of the drive for higher capacity facilities in stripping. *Coal Age* will be reporting on these new units in 1957, with particular emphasis on overburden preparation for higher stripping efficiency.

### In Preparation . . .

• The fine-coal circuit, being found with increasing frequency in the preparation flowsheet, will be subject of additional preparation features in 1957, along with such developments as the conveyorless plant (all chutes and screens, except for the final loading step) and the low manpower plant (one man is the goal).

### In Services . . .

• Maintenance becomes more critical with the development of each new, higher-capacity, more-complex mining unit. It will be a major objective in material for the 1957 issues of *Coal Age*, along with other services, not forgetting safety. In the latter category, as an example, an account of how one big mine is putting together long strings of low-accident months is scheduled for an early issue.

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# TEXACO



## **HOW** to make wire rope last longer, open gears run quieter

**Lubricate** with *Texaco Crater*. On wire rope it penetrates quickly and thoroughly. Each metal strand is coated with a long-lasting film of lubricant that protects against wear and rust. The core, too, is surrounded by the *Texaco Crater*, preventing its drying out. Naturally, your rope stays strong longer, your maintenance costs come down.

On open gears, *Texaco Crater* provides tough, long-lasting lubrication. It clings persistently to the gear teeth, muffling noise and reducing wear. Gears run smoother, last longer.

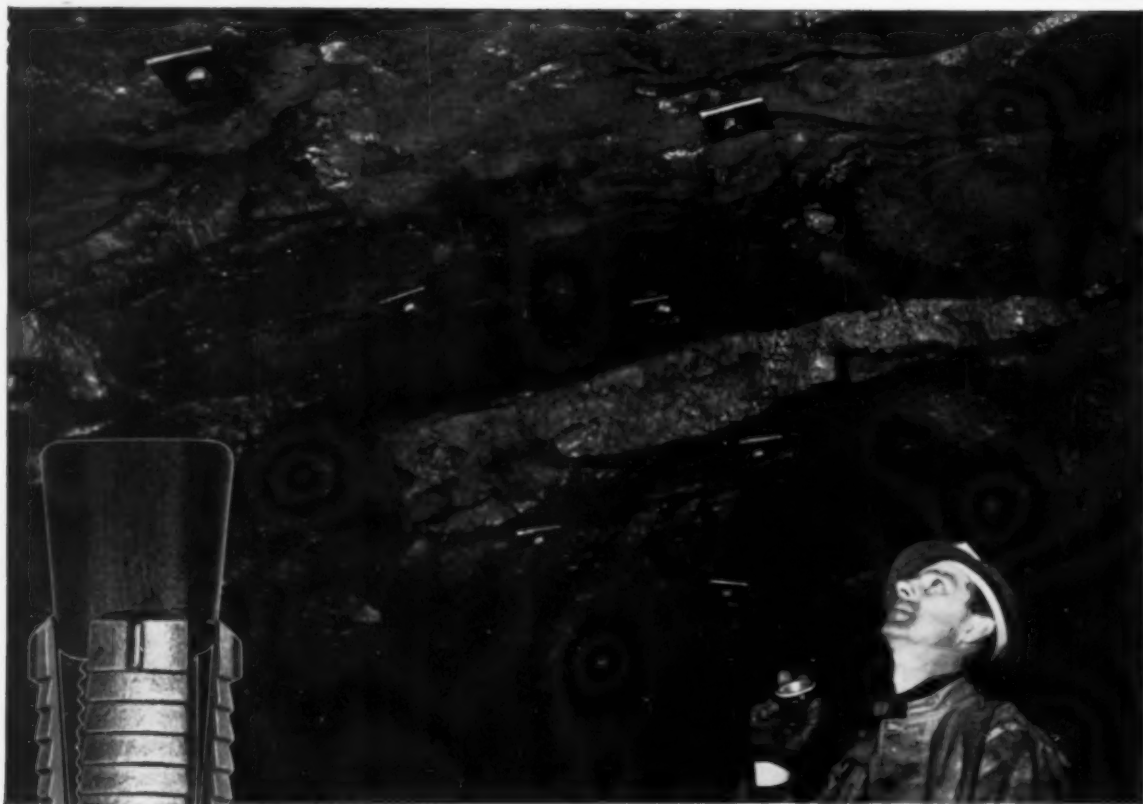
For both applications, many operators prefer *Texaco Crater X Fluid*. It's the same fine lubricant but designed for spray application. It goes on as a liquid, *stays* on just like regular *Crater*.

In all types of mine car wheel bearings, use *Texaco Olympian Grease*. It assures easier starts, winter and summer, smoother operation, lower maintenance costs.

Let a Texaco Lubrication Engineer help you improve equipment efficiency and reduce costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

## **LUBRICANTS for the Coal Mining Industry**



## Here's Protection Against Severe Roof Falls

A severe roof fall can mean trouble in more ways than one. It may result in injuries to workmen. It also means loss of production.

But damage from severe roof falls is far less likely when you carry out a modern roof-bolting program, using either the Bethlehem  $\frac{3}{4}$ -in.,  $\frac{5}{8}$ -in. or  $\frac{7}{8}$ -in. square-head roof bolt and expansion shell. This method of roof support makes the mine a safer place in which to work because it effectively anchors the rock.

**Other Advantages** In addition to promoting safety, roof bolting also offers the advantages of increased production through operating mechanical equipment close to the face; improved ventilation; faster transport; less damage to equip-

ment; better housekeeping; no fire hazard.

**How Bolt is Used** A leaf-type malleable iron shell is attached to the Bethlehem square-head bolt before it is placed in the hole. When the bolt is tightened, the leaves of the shell expand to firmly grip the sides of the hole. Additional support is provided by a square roof plate. A hardened washer is used between the bolt head and roof plate to minimize friction.

You'll want to look into the possibilities of a roof-bolting program, using the Bethlehem square-head bolt. Or perhaps you would prefer Bethlehem's slotted wedge-type bolt, also designed for roof support. Either way, you'll find the nearest Bethlehem sales office ready to answer your questions. Why not call them right now?

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

# BETHLEHEM MINE ROOF BOLTS



# Users save time and money with entirely new-type grease, resistant to

- water washout
- temperature extremes
- rigorous mechanical working

Greases made with the revolutionary new grease thickener—Du Pont Estersil GT—give you all these properties.

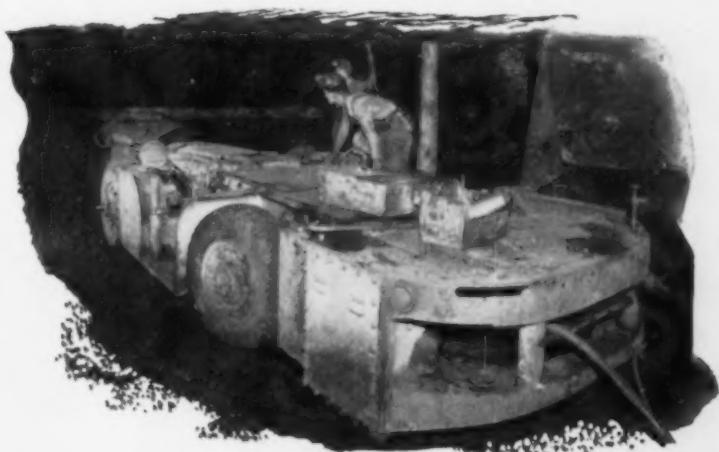
#### Proved in service

Already, millions of pounds of grease made with Du Pont Estersil GT have been used in a wide variety of industrial applications. And the success attained has been as remarkable as the qualities of this unique product.

A coal mining company, for example, reports that one unit of its equipment formerly required from two to three gallons of regular lubricant per shift. But when an estersil semi-fluid grease was used, average consumption dropped 75%, to two to three quarts per shift.

#### Longer gear life

When rebuilding its machines, this company had always replaced the gears, as a matter of routine. But since switching to estersil grease, gears can be used over and over again without significant wear. This is because the



MANY USERS of heavy-duty equipment, such as this coal-mining machine, report that they have increased equipment life and lowered grease consumption and maintenance costs through the use of estersil-based greases.

estersil grease effectively seals out dirt, coal dust and other foreign matter.

#### Maintenance costs down 50%

Another industrial grease user reports that an estersil-based grease has caused his maintenance costs on one group of machines to drop from .185 cents to less than .09 cents per ton of product handled.

#### What it is

Du Pont Estersil GT is an entirely new type of grease thickener, a completely synthetic form of finely divided amorphous silica.

One of its unique features is that each minute particle is encased in a

chemical "raincoat." This gives estersil-based greases positive, built-in water resistance . . . eliminates the danger of washout.

Non-melting estersil greases show little change in consistency when subjected to extremes of temperature. And under prolonged high-shear, high-temperature operating conditions, estersil greases show outstanding resistance to mechanical breakdown.

Du Pont Estersil GT is now available to grease compounders in commercial quantities. Check with your supplier or write us for more detailed information and samples of grease made with estersil.

#### USE THIS COUPON



Better Things for Better Living  
... through Chemistry

## Petroleum Chemicals

E. I. DU PONT DE NEMOURS & CO. (INC.)  
Petroleum Chemicals Division • Wilmington 98, Delaware

☐ Please send literature on Du Pont Estersil GT. ☐ Please send samples of grease made with estersil. ☐ My lubrication problem is discussed on attached sheet.

Name.....

Company.....

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City..... State.....

# NOW . . . step up dragline output ... WITH ALL-NEW BUCYRUS-ERIE BUCKETS



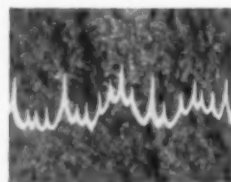
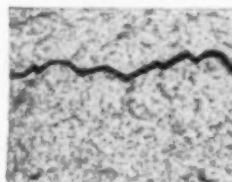
You swing more payload, less deadweight every hour with the new Bucyrus-Erie dragline buckets. A combination of an all-new, lightweight yet strong design and a new long-wearing material makes it possible.

The new material is BECOLOY, a special steel alloy with a tough, fibrous structure ideally suited to dragline bucket service. The new design features a "slicing-action" lip that penetrates material quickly, and a tapered basket shaped to load full and fast. Proper flaring and balance minimize spilling and bobbing. The inside design is smooth and the arch is extra high for fast, clean dumping.

Your Bucyrus-Erie distributor can help you select the right size and model of these new buckets to fit your job, to bring you better out-

put performance than ever before. Three types are available—light, medium and heavy-duty—with either solid or perforated baskets.

**BECOLOY** . . . exclusive new alloy for Bucyrus-Erie dragline buckets.



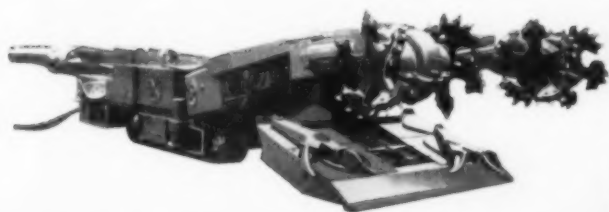
The BECOLOY fracture surface at right shows the tough, fibrous structure that imparts high strength to this alloy. Ordinary steel fracture surface, at left, has a coarse, crystalline pattern.

19R56



SOUTH MILWAUKEE, WISCONSIN

ONLY THE *Lee-Norse* MINER gives you



"P A T T E R N  
C U T T I N G"



The Lee-Norse Miner cuts a "DIAMOND PATTERN"

in the face of the coal by simply revolving and oscillating the cutters at the same time. This is sometimes called "milling the coal off the face."

Every single Cutter Bit follows a right and a left spiral thread which produces the multiple criss-cross kerfs in the face of the coal. The dia-

mond pattern is unique and very important because:

1. It cuts more coal with less power.
2. It produces coarse cuttings and less fines.
3. It is a simple and rugged mechanical device.
4. It instantly follows any variation in the thickness of the coal seam.
5. It is the ONLY REALLY NEW cutting tool introduced in recent years.

The Lee-Norse Miner is essentially a modern loading machine plus the most practical device for cutting coal. The Lee-Norse Miner loads all the coal from the floor with improved "dual" gathering arms and a flexible rear conveyor. Excellent clean-up . . . fast tramming.

*Lee-Norse Company*

CHARLEROI, PA.

DESIGNERS AND BUILDERS OF THE MINE PORTAL BUS

# NOW . . . step up dragline output . . . WITH ALL-NEW BUCYRUS-ERIE BUCKETS



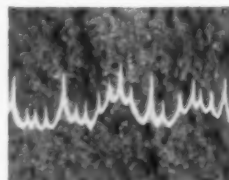
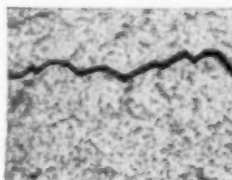
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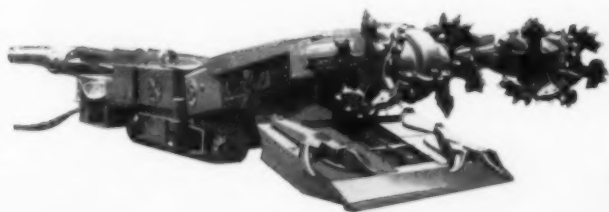
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C U T T I N G"



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4. It instantly follows any variation in the thickness of the coal seam.
5. It is the **ONLY REALLY NEW** cutting tool introduced in recent years.

The Lee-Norse Miner is essentially a modern loading machine plus the most practical device for cutting coal. The Lee-Norse Miner loads all the coal from the floor with improved "dual" gathering arms and a flexible rear conveyor. Excellent clean-up . . . fast tramming.

*Lee-Norse Company*

CHARLEROI, PA.

DESIGNERS AND BUILDERS OF THE MINE PORTAL BUS

## Introducing a tough "Lightweight"



## NEW Amsco® Manganese Steel LIGHTWEIGHT DIPPER

**Rugged  $\frac{3}{4}$  yd. dipper, made of the "toughest steel known," actually work-hardens under impact**

Those big, tough Amsco Dippers now have a smaller brother. With this new, rugged, lightweight dipper, small shovel operators can enjoy the combined advantages of long-wearing manganese steel and proved Amsco design features, such as:

- One-piece manganese steel back castings
- Arch formed by complete box section for maximum strength
- Teeth are set for clean, fast digging
- Interior is designed for rapid dumping
- Lugs for handle, back, and braces are cast integral with back—for extra strength
- 25% lighter than standard Amsco  $\frac{3}{4}$  yd. dipper, per-

mitting use on light-duty shovels and allowing their developed power to be more fully utilized

- Curved door in back, for full-capacity loading with each pass

Ask your shovel manufacturer for full information—or write us direct for descriptive literature.

### "Vital Statistics" on this new lightweight champ

Height of front over teeth.....	4 ft. $\frac{3}{4}$ in.
Height of back.....	2 ft. 7 in.
Opening at top.....	2 ft. 5 in.
Opening at bottom.....	2 ft. 7 in.
Approximate weight.....	1550 lbs.



# AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DELAWARE, OAKLAND, ST. LOUIS, JOLIETTE, QUEBEC

# TOUGH HEAVY DUTY MINING CABLES *that have no equal!*

New SUPERTUF JACKET\* makes  
SUPER SERVICE MINING CABLES  
tougher than tough



\* General Cable's remarkable  
Flame Resistant SUPERTUF JACKET  
is a new neoprene compound  
processed for maximum lasting  
toughness, high density and tensile  
strength—extra smooth for wear,  
cut and tear resistance.



## General Cable... at your service!

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y. Offices and Distribution Centers Coast-to-Coast

COAL AGE • December, 1956

**JIGGING** stratifies materials according to specific gravity, separating solids in upward and downward pulsations of water. The heavier materials settle to the screen plate and are drawn off. The lighter materials overflow.

**JIGGING** is an almost universal separating process for materials ranging from the specific gravity of gold at 19 to coal at 1.3. Proportions of the high-gravity materials may vary from 90% to 10% or less.



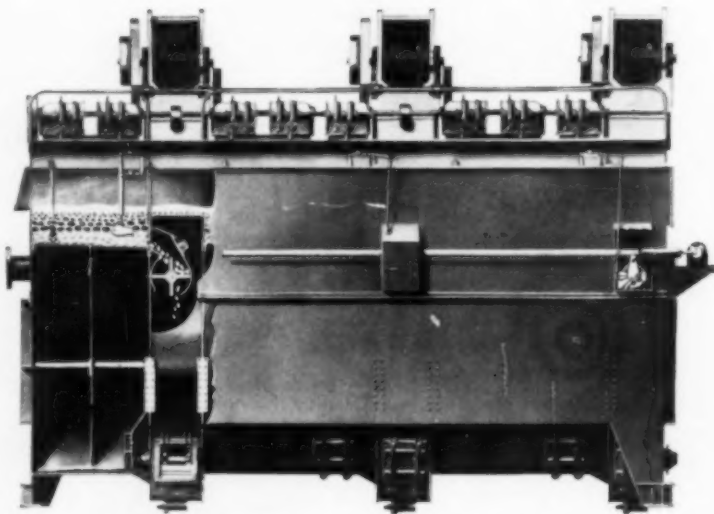
## 800 TONS PER HOUR...PER JIG!

**Jeffrey coal-cleaning jigs have grown with the demand for higher tonnages and lower costs**

Jeffrey jigs, in any size, provide a low-cost means of cleaning coal, separating fine and coarse sizes simultaneously. For years they've been handling some of the toughest separation jobs, recovering above 99.5% of the coal of a specified quality.

With a new principle of operating the Baum jig, Jeffrey has been meeting the constantly increasing demands for greater production by enlarging equipment.

If you have a coal cleaning problem, write to the Materials Preparation Division, The Jeffrey Manufacturing Company, Columbus 16, Ohio.



An 800-ton-per-hour Jeffrey jig stands 24 feet high and is 35 feet long.



CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



## BEHIND THIS SYMBOL

...are many years of valuable experience in meeting the exacting requirements of the coal industry for explosives and detonating equipment. You can rely on AMERICAN for precision performance and efficient cooperation in solving any unusual blasting problems. Fast delivery is assured by conveniently located plants and magazines.

### THE AMERICAN LINE

High Explosives	Electric Blasting Caps
Permissibles	Instantaneous
Blasting Powder	Regular Delay
Blasting Caps	Split-Second Delay
Blasting Accessories	

*If it's AMERICAN, it's dependable!*



Sales Offices: New York City, Latrobe, Pa., Pottsville, Pa., Scranton, Pa., St. Louis, Mo., Bluefield, W. Va.

**In Ohio . . . . and the World Over**



*Bucyrus-Erie Ward Leonard  
Electric Excavators*

**KEEP COSTS DOWN . . . KEEP OUTPUT UP**



Bucyrus-Erie Ward Leonard electric excavators are helping coal operators everywhere with their modernization plans to boost output while cutting costs. For example, the 150-B shown above is loading unshot coal for the Sunnyhill Coal Co., near Lexington, Ohio.

These modern machines are designed to meet today's production problems. The front end has plenty of strength without dead weight—material can be moved with less effort and power consumption. Ward Leonard control provides rapid acceleration and deceleration to help achieve high-speed digging

cycles. There is plenty of extra torque and ample usable power when most needed.

Plan to bring the advantages of these modern shovels to your operations.

91L56



South Milwaukee, Wisconsin

*Bucyrus-Erie Company*

# Congratulations!

... to the American Telephone & Telegraph Company upon the completion of the new Transatlantic cable linking Europe and America.

This engineering achievement, the result of cooperative American and British enterprise, signalizes a new era of greatly improved Transatlantic telephone service.

Simplex Wire & Cable Co., as manufacturer and supplier of the American-made part of the submarine cable used in this gigantic project, is understandably proud to have participated in this historic accomplishment, and in the development work which made it possible. **SIMPLEX WIRE & CABLE CO.**, 79 Sidney Street, Cambridge 39, Mass.

## Simplex

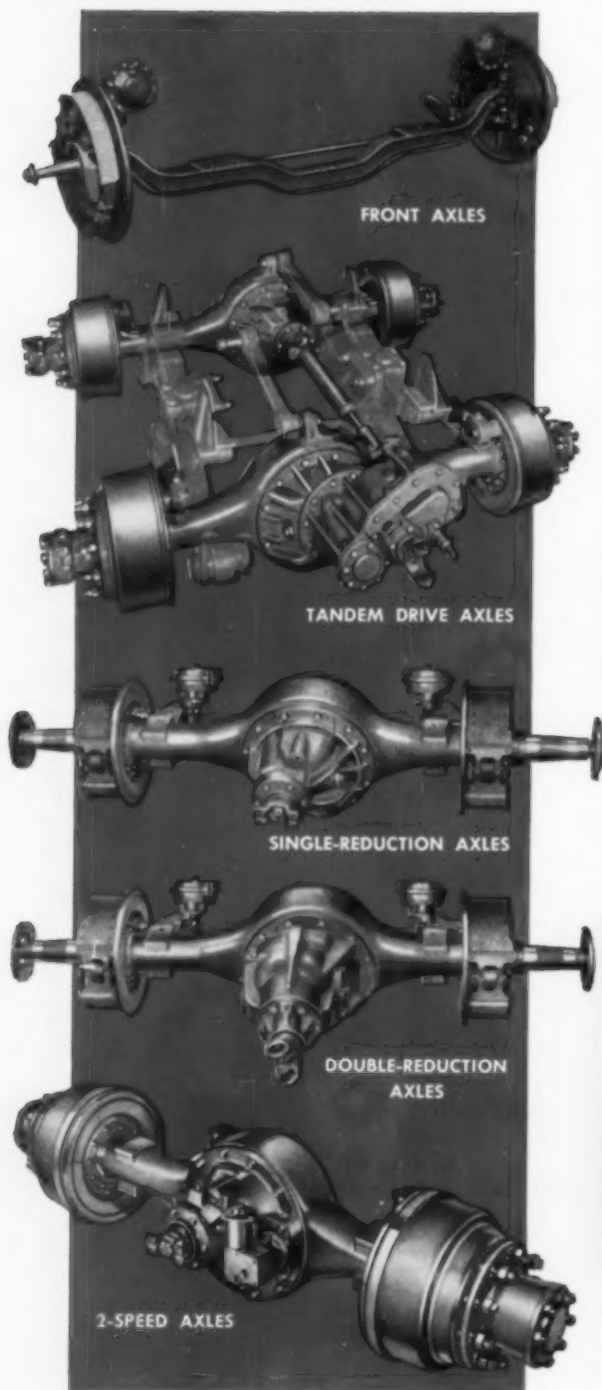
Wires and Cables for:



# EATON AXLES

**Outstanding  
Performance Cuts  
Hauling Costs, Assures  
Longer Vehicle Life**

Strict adherence to exacting quality standards, the most modern of production procedures, and important design advancements developed through Eaton's years of axle experience, combine to offer the truck operator axles with many worthwhile benefits. Eaton Axles, engineered for rugged stamina, keep trucks on the job, hold down operating and maintenance costs, and deliver more vehicle miles at lower cost per mile.



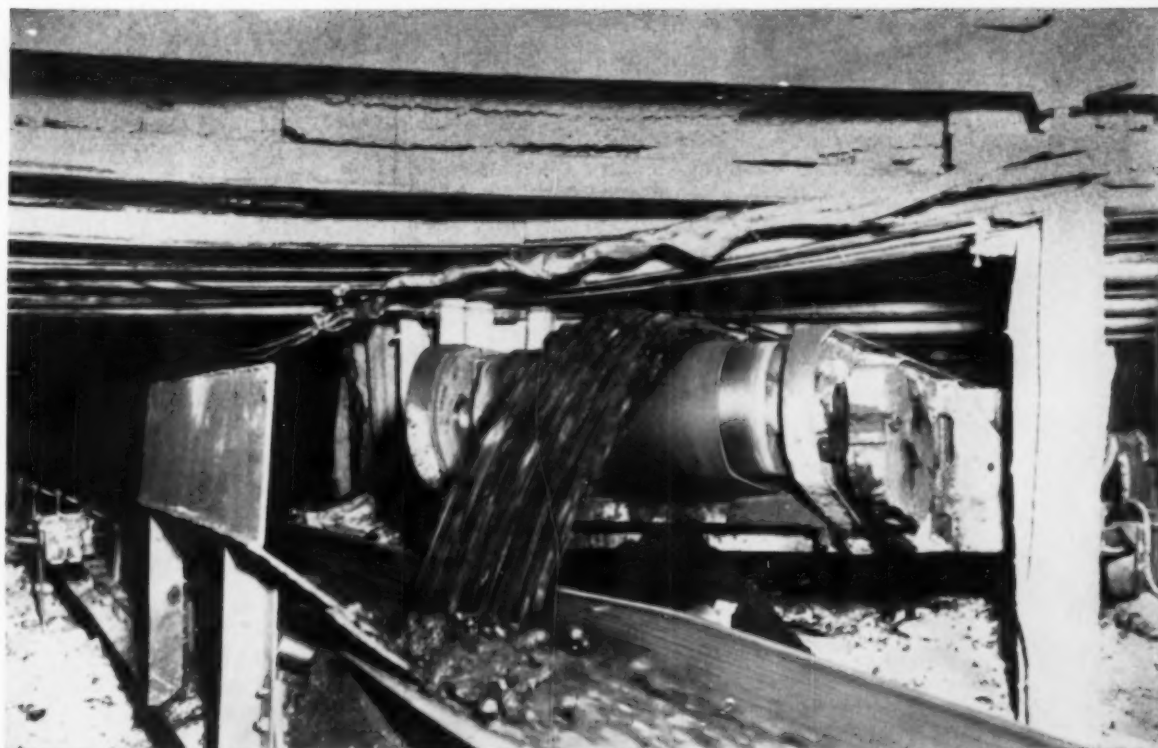
This rugged housing, used in famous Eaton 2-Speeds, is also used for Eaton single-reduction and double-reduction axles. The three types of heads are interchangeable.

# EATON

AXLE DIVISION  
MANUFACTURING COMPANY  
CLEVELAND, OHIO

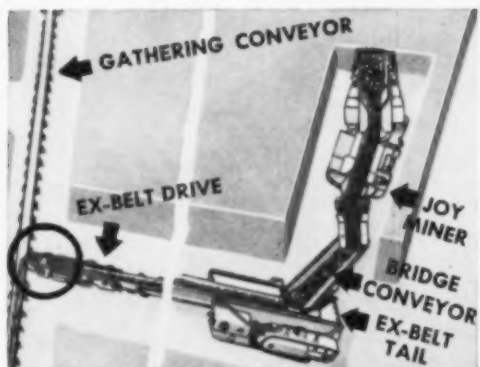


**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



**EXTENSIBLE BELT CONVEYOR** discharges coal onto gathering conveyor for trip to preparation plant (See diagram below). Labor-saving system depends on neoprene for belts that give long wear... retard flame.

## Rugged neoprene belts give long service in continuous haulage systems



• Continuous system starts at the Joy 1-CM Miner which loads on the Bridge Conveyor and then to the Joy "Ex-Belt" Conveyor. The Extensible Belt Conveyor will extend up to 1,000 feet.

Higher production at a low cost is the big advantage of the new Joy Extensible Belt Conveyor combined with the Joy 1-CM Continuous Miner. Such a system makes continuous haulage from the mining face a practical, economical operation.

The tough, abrasion-resistant neoprene belt provides a steady stream of coal from face to gathering belt. Lightweight and flexible, the Ex-Belt conveyor can be quickly lengthened by adding 100-ft. lengths of belting, and setting up additional conveyor stands as the mining advances.

Neoprene belting was chosen for this system principally because of its flame retardance. In addition, neoprene's resistance to abrasion, tearing and chipping assures long service life, minimum maintenance for the belts.

It will pay you to specify belts with covers made of neoprene, Du Pont's synthetic rubber, just as it has paid you to specify neoprene jacketing for all of your mine trailing cable.

## NEOPRENE

The rubber made by Du Pont since 1932



Better Things for Better Living... through Chemistry

### FREE! THE NEOPRENE NOTEBOOK

Every issue contains new illustrated case histories, interesting articles, new ways to save with neoprene. Mail this coupon today to E. I. du Pont de Nemours & Co. (Inc.), Elastomers Division 60-12, Wilmington 98, Delaware.

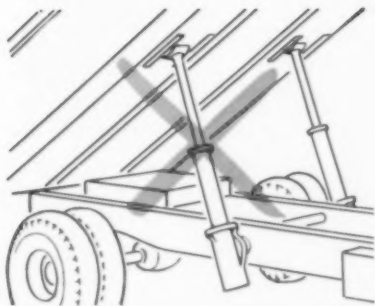
Name \_\_\_\_\_ Position \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



# GRAVITY dumps the load...in



# ONE second



## Koehring Dumptor<sup>®</sup> has no body hoist

Operator drives up, trips the body-release lever — and *gravity* tilts the 6-yard body 70 degrees. One second later the load is out, and Dumptor is on its way back for the next load. It's as simple and fast as that!

There's no 15 to 25-second wait for slow-acting body hoists — no expensive hoist replacement parts, maintenance or down-time. And, you get the same one-second dumping *every time*, under heaviest loads, in all temperature extremes, because Koehring *gravity-dump* never balks — never wears out.

One-second dumping earns a substantial increase in yardage output, too. For example — take a typical 1,000-foot haul where you would normally make 16 trips an hour. By saving an average of 20 seconds dump-time on each trip, Dumptor gains 320 seconds, or 5.3 minutes more productive haul-time per hour. You get 17½ trips, instead of 16. This, alone, adds 9% to hourly production.

This saving is typical of Koehring Dumptor's basic principle — to reduce all non-productive time to a minimum — to increase work-time for more yards per day. See Koehring distributor for complete information.

## KOEHRING COMPANY

MILWAUKEE  
16  
WISCONSIN  
K640



Subsidiaries:  
JOHNSON  
PARSONS  
KWIK-MIX



Saves 20 seconds every time it dumps — Heaviest loads are dumped instantly. Tilting Dumptor body rolls on heavy-duty rockers. Snub chains attached to big shock absorbers check the body at approximately 70-degree tilt.



Shuttles back and forth without turning — Dumptor operates with equal ease in either direction. Constant-mesh transmission gives the same 3 travel speeds forward and reverse. Every turn eliminated cuts 15 seconds off cycle time.



64 square-foot loading target — Big, square body opening permits loading over either end or sides. Top edge and bottom are box-beam constructed. Sides, ends, heavily rib-reinforced. ½"-thick kick-out pan bolts to floor for rock work.



"Easy as filling a coffee bag," say men who prepare supply of Akremite.



Simple and safe to store, Akremite can be mixed right at the mine location.

## "How We Cut Blasting Costs 50%, Increased Output 20%, with New Akremite Process"

*Spencer prilled Ammonium Nitrate is base for new simple, safe, low-cost explosive*

"We've found the new Akremite Blasting Process, now in use at our Cheshire, Ohio, operations, to be the ideal explosive for strip mining," reports F. H. Howe, Superintendent of Ohio River Collieries. "Because the ingredients are cheaper and the mixing process so much simpler, we have cut explosive costs 50% with Akremite. At the same time, better fragmentation produced by Akremite lets us move 20% more yards per month.

"The terrain in which we work is unusually difficult, but because Akremite is so safe and easy to handle, we still come out ahead."

☆☆☆

Akremite, the simple but revolu-

tionary new explosive, is named after its inventor, R. I. Akre, superintendent of drilling at Maumee Collieries Co., Terre Haute, Ind. Akre uses prilled Ammonium Nitrate, produced by Spencer Chemical Company, as the base for his new explosive.

By itself, ammonium nitrate is not an explosive. But Akre found that if he mixed it with carbon black, packed it in a polyethylene bag, confined it in a drill hole and detonated it with a high gelatin dynamite and primacord, it produced a tremendous explosion.

Recently, an independent research organization put Akre-

mite through a series of safety tests. They fired bullets into bags of freshly made Akremite. And they conducted the regular pendulum-friction and modified propagation-through-air tests.

Not a single explosion, fire or crackling resulted from any of these tests. Akremite with Spencer prilled Ammonium Nitrate is not only cheaper and better, but many mines report it is the safest strip mine explosive they have ever used.

(NOTE: Spencer Chemical Co. will be happy to provide you with further information about the Akremite Method as discussed by Mr. Howe.)

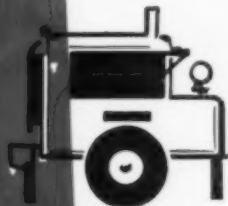
### SPENCER CHEMICAL COMPANY

610 Dwight Building • Kansas City 5, Mo. • Baltimore 1-6600

*Got a tough job?*

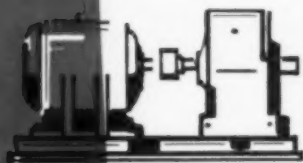
## Give it to STANOIL Industrial Oil

*This oil gives superior lubrication to a long list of mine equipment—here are three big jobs it can do—*



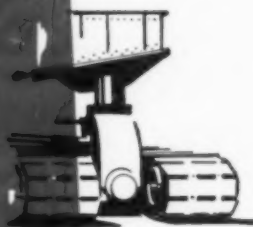
### COMPRESSOR

High oxidation stability and low carbon-forming characteristics of STANOIL virtually eliminate the danger of carbon deposits on valves. STANOIL separates readily from water. There is no problem of emulsion in compressor crankcase.



### SPEED REDUCER

There are many years between maintenance jobs on speed reducers when STANOIL is the lubricant. Herringbone gears remain clean and free of wear. Low pour point of STANOIL gives oil ability to flow freely from a cold start. No trouble either in prolonged, high temperature operation.



### HYDRAULIC JACKS

Tough mine hydraulic service is the ideal place for STANOIL. High viscosity index and low pour point of STANOIL assure smooth operation no matter what the temperature. STANOIL resists contamination, will not emulsify.

Pick your tough lubrication jobs, give them to STANOIL Industrial Oil and get the results you have wanted. Find out more. Call your Standard Oil industrial lubrication specialist. There is one near you in any of the 15 Midwest and Rocky Mountain states. He is experienced in mine lubrication. Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

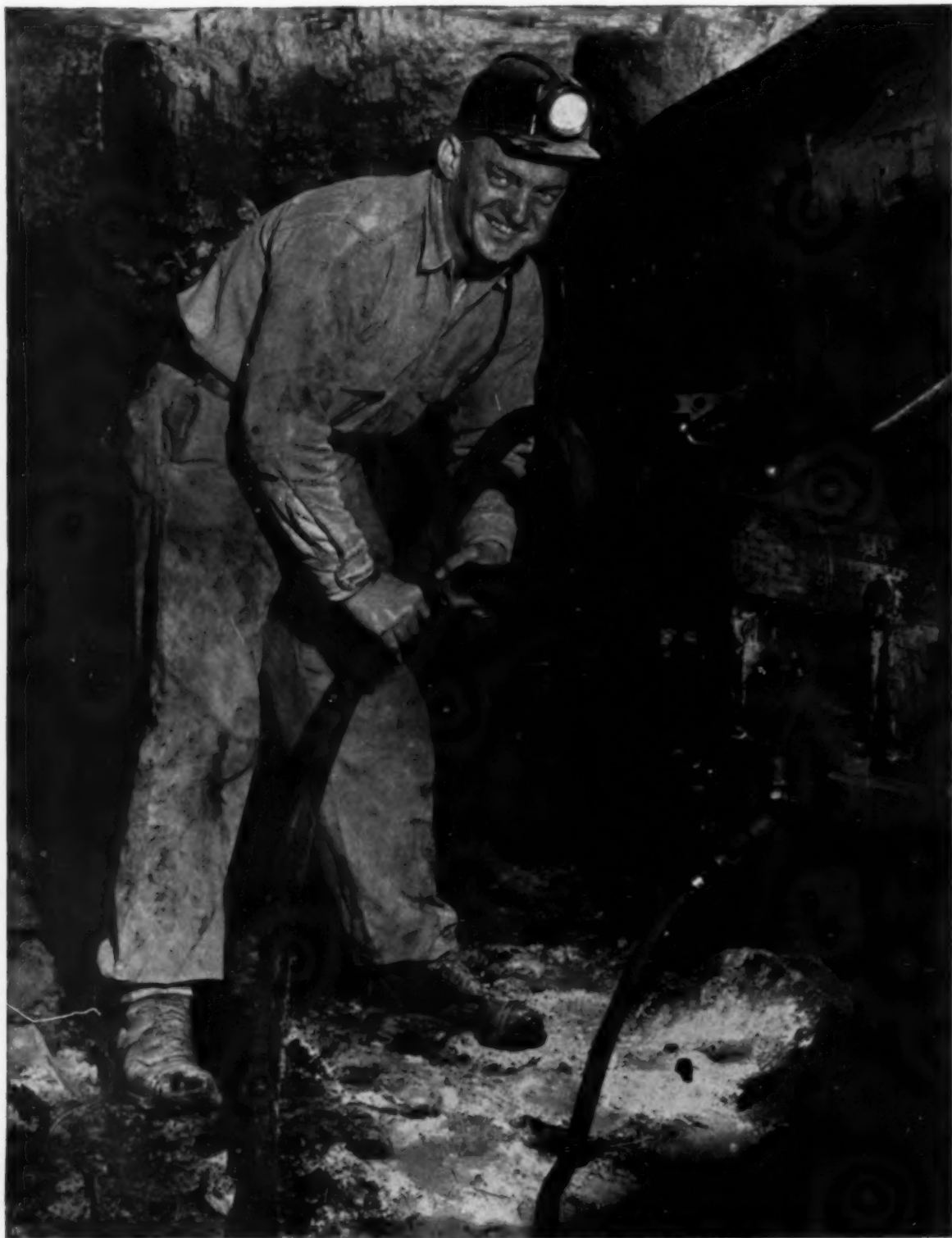
### Quick Facts About STANOIL Industrial Oil

- **Stability**—STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention**—Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts**—STANOIL has low pour point. Flows freely from cold start. No need for costly warm-ups.
- **Resists Effects of Temperature Change**—STANOIL has high viscosity index, is resistant to temperature change.
- **Has Excellent Demulsibility**—STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY  
(Indiana)



## If you watch cable costs



11 conductors in this continuous miner cable, yet see how flexible it is.

# you'll like Tiger Brand

It's always a thrill to walk into a tough, cost-conscious mine and find that they are using huge quantities of Tiger Brand Amerclad mining cable. It vindicates our attitude that mining cable *must* be built to the very highest standards.

Our flat "Bridgewall" cable is an example. Tiger Brand flat twin mining cable in sizes #1 and smaller actually has a thick wall of neoprene between the insulated conductors. It locks the conductors and ground wire (if specified) in a tight embrace and holds them there—even when the cable is badly bent or twisted. No other type of construction is so durable.

Naturally, flame-resistant jackets are used throughout. And all of these very-heavy-duty cables are vulcanized in a lead mold under pressure, to insure a dense, tough jacket. *Money cannot buy a better cable!*

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL  
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS  
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



● This special cable was made for continuous miner. It contains power, grounding, lighting and communication conductors.

● Rubber-tired buggy fed with "Bridgewall" Tiger Brand. Cable is under continuous strain.

## USS TIGER BRAND ELECTRICAL WIRE & CABLE



A STANDARD TIGER BRAND CABLE FOR  
EVERY SPECIAL JOB

- interlocked armor cable
- special purpose wire and cable
- asbestos wire and cable
- lead cured portable cord
- paper and lead cable
- aerial, underground and submarine cable
- shovel and dredge cable
- varnished cambric cable

UNITED STATES STEEL



Research

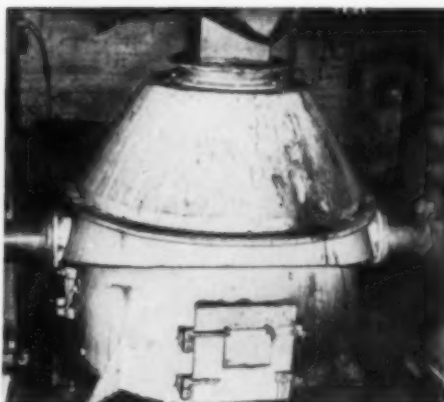


... + H & P CYCLONES  
+ Reineveld Centrifuges

are combined in the

**HEYL & PATTERSON CIRCUIT**

to produce a scientifically designed Fine Coal Washing  
and Water Clarification Plant



**The H & P Self-Balancing Circuit Offers These Advantages:**

→ **Lower initial investment**

→ **Lower operating and maintenance cost**

→ **100% recovery of all solids reporting from the clean  
coal discharge of your separating equipment**

→ **Closed water circuit operation**

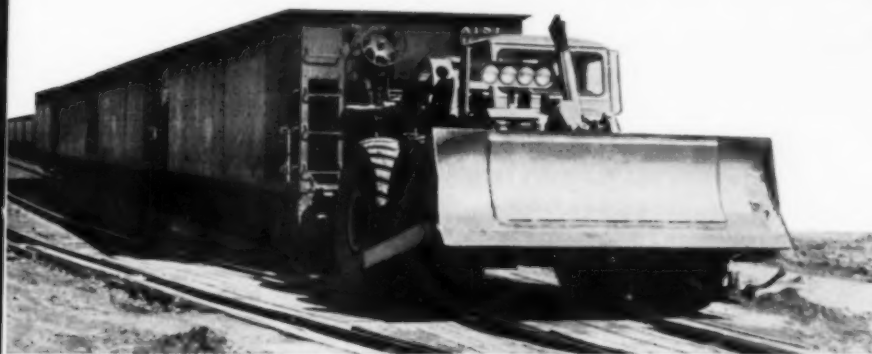
→ **THIS ADDS UP to the most economical fine coal  
washing and recovery method...the H & P Circuit**

**Heyl & Patterson**  
INC.

55 FORT PITT BLVD. • PITTSBURGH 22, PA. • PHONE COUrT 1-0750

When efficiency and economy count... count on H & P.  
Get all the money-saving facts  
from a Heyl & Patterson  
Sales Engineer

# At desert uranium plant versatile **SwitchTractor** shunts ore cars, dozes, cleans-up



Amos Leach, right, general crusher foreman, points out sturdy construction of SwitchTractor coupler, left, to Operator Marion Roberts. Rubber-tired switcher pushes 18 empty ore cars, pulls 5 loaded cars up 1% grade.

Big 208 hp SwitchTractor moves strings of ore cars to siding at Anaconda uranium mill. Low-pressure tires won't damage tracks, ties, or switches. SwitchTractor takes most direct route to any job, isn't tied to tracks.

Here's the story how The Anaconda Company solved a problem of rail traffic handling—together with pit and plant clean-up—at its uranium works in New Mexico. Anaconda needed switching service for ore cars at both terminals of a 35 mi. rail-line connecting a mine near Laguna with a processing plant close to Grants. Both locations are in the desert west of Albuquerque.

A survey of probable switch-yard activity showed that car-shunting and spotting would be an intermittent job. If standard switch-engines or specialized rubber-tired switching vehicles were used, they would be idle much of the day. While these machines "mark time", costs mount.

## Wanted: dual-purpose machine

The metals firm decided it needed a dual-purpose machine—a coupler-equipped tractor. One with the "beef" to push or pull strings of ore

cars... to doze, and haul equipment wherever needed around pit and plant. It wanted a fast, mobile rig—one able to speed from one job to another at short notice.

## Double-duty SwitchTractor handles switching, dozing

Anaconda solved the problem with two versatile LeTourneau-Westinghouse SwitchTractors—one for each work center. Both at mine and mill, rigs met all job requirements.

At the Grants mill, Anaconda's SwitchTractor spots ore cars in the plant yard, keeps stockpiles in shape, cleans-up debris, hauls and pushes other mobile equipment. A. J. Fitch, manager of the New Mexico operations, had this to say about SwitchTractor's mill work:

**"Moves 1,000,000 lbs."**

"The machine has proved to our satisfaction that it can move a train

of 1 million gross pounds up a 1 per cent grade. Riding over rails and switches proved no handicap."

In terms of cars, this means that SwitchTractor moves 18 empty or 5 loaded carriers up the incline.

Amos Leach, general crusher foreman, put it this way: "This tractor is very handy. It gets around nicely... both on and over railroad tracks, ties, and switches."

## On 3 special jobs

"Around the plant," he added, "it speeds clean-up work after construction jobs...also loosens up stockpiles of packed ore, making them easier to handle. It pushes other heavy machines on cold mornings, too, to get them started."

SwitchTractor can solve the car handling problem on *your* sidings too...save you money doubling as a heavy-duty, clean-up tool around pit and mill. Let us give you complete details on this go-anywhere, dual-purpose tractor.

*If you already own a Tournatractor, it can be easily converted for car-switching work, simply by the addition of a car-coupler at the rear. Write or phone for details.*



SwitchTractor—Trademark; Tournatractor—Trademark Reg. U.S. Pat. Off. 5T-1072-M-b



**LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS**  
A Subsidiary of Westinghouse Air Brake Company

ARBA



See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

# JOY RBD-15

## ROTARY ROOF BOLTING DRILL FOR SHALE, SLATE, OR SANDSTONE ROOF

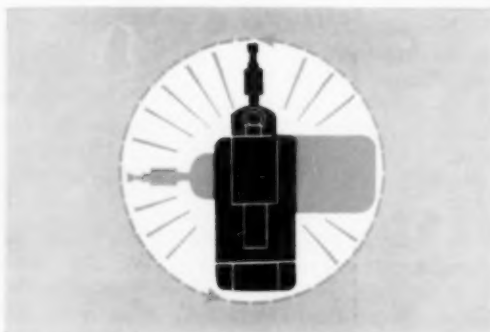


The Joy RBD-15 is a hydraulic rotary drill designed to bottom holes in 65% of all U. S. coal mines in often half the time required by pneumatic or electric drills. A central hydraulic system coupled directly to a 15 hp electric motor powers tramming, steering, drill rotation, drill feed and boom roll.

The RBD-15 operates in seams from 42" to 96" high. One basic frame and chassis is offered in two heights; the 33" model for low and medium-low seams, and the 37" model for high seams, or for medium seams requiring high ground clearance.



*Simple controls, centralized at the operator's station, provide instant control of thrust, feed-speed and torque and drilling angle. Drills, runs steel and sets bolt without gear shifting.*



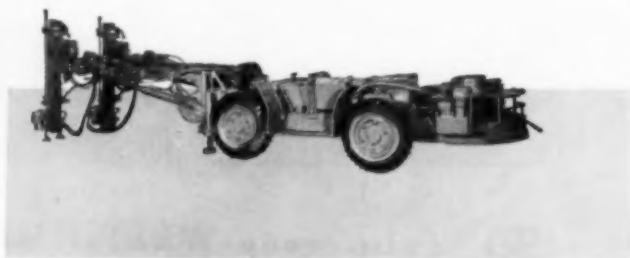
### HIGHLY MANEUVERABLE

The RBD-15 is fast and flexible . . . trams up to 108 fpm. Individually controlled pairs of wheels on each side can be powered independently . . . forward on one side—reverse on the other . . . the machine turns in its own length (dimensions 33" x 42" x 9' 6") like a crawler mounted unit.

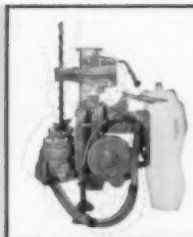
## TWIN BOOM MODEL

The RBD-11 has twin booms with RDU-1 drill units. Each boom swings 90° out and 25° in to provide a 23 foot face drilling range . . . has 240° roll and 30° tilt . . . can be individually controlled. The RBD-11 is an all-hydraulic machine, 43" high, 82" wide and 22' long, equipped with a 26 hp electric motor, and a four section hydraulic pump. The RBD-8 is a single boom version of the RBD-11, available with either electric or diesel power.

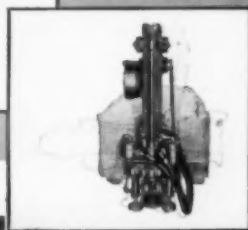
The RBD-7 is an unmounted boom and drill unit to be mounted on a mine car or shuttle car.



## DRILLS AT ANY ANGLE GETS IN ANYWHERE (TURNS IN ITS OWN LENGTH)



Boom Tilt



Boom Roll

The two sketches at upper right illustrate the action of the hydraulic boom roll and the easy manual tilt that makes it possible for the RBD-15 to drill at any angle. The boom roll also allows the operator to change steel without moving the machine. The drill unit consists of a two-speed rotation unit, a two-speed feed unit, steel centralizer and two foot jacks . . . all mounted on a rigid feed frame.

Two hydraulic rotation motors allow the operator to choose rotation speed and torque . . . 650 rpm for high speed drilling . . . low speed up to 360 rpm with torque up to 240 ft. lbs. for tightening bolts or harder drilling.

Feed thrusts can be varied up to 5500 psi . . . feed speeds up to 12 fpm, with "run-up" and retraction speeds up to 60 fpm. Write *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Write for **FREE Bulletin 134-1**



### "SPECIAL ROOF-TESTING SERVICE"

*A special laboratory method of testing rock samples can show you what to expect with your roof conditions. Samples are shown below. Joy will run these tests for you.*



WSW CL 6347-134

# JOY

**WORLD'S LARGEST MANUFACTURER  
OF UNDERGROUND MINING EQUIPMENT**

BUYER



CF&I



**Your Wickwire Rope  
Distributor and our  
metallurgist...  
work together for you**

This metallurgist—who is responsible for the quality of our rope wire—is with your Wickwire Distributor every time he makes a call.

True, he's physically in his laboratory, supervising the thorough testing of *both ends of every coil* of wire to assure uniformity throughout the coil. But, whenever your Wickwire Distributor calls, he has the full assurance that metallurgists like this are constantly making sure that the product has the right chemical and physical properties to give long, dependable service.

It's just one more reason why your Wickwire Distributor knows he's got top-quality wire rope, slings and strand to sell... and that these products will serve you well.

4084

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION



No hydraulics  
to break, leak  
or freeze-up!

No small front  
steer-wheels  
to align!

No tie-rods  
to bend!

No springs  
to break!

No frame  
to warp!

No long drive-shaft  
to maintain!

## Cuts your hauling costs!

### Tournapull Rear-Dump overcomes most maintenance problems of conventional haulers

Construction of Tournapull Rear-Dump is radically different (and much simpler) than that of a conventional heavy-duty hauler. In place of a foundation frame and body sub-frame, Tournapull Rear-Dump hitches rear and front wheels through a horizontal yoke extending back from the kingpin, and pivoted to body itself just above and ahead of rear wheels. Body is simpler, much stronger... has no frame and sub-frame to get out of line.

Look at the photo above... note the absence of springs, spring hangers, and tie-rods. Low-pressure tires adequately absorb the shocks of rough haul-road travel and shovel loading. Eliminated

are spring maintenance, replacement time, and cost of spring parts.

Front-wheel drive and kingpin-type power steer helps simplify Tournapull construction, too. No longer must power be carried back to the rear through a drive-shaft. Bearing and lubricating problems of a long drive-shaft are eliminated. No longer is steering handled by small front wheels subject to "bulldozing" and misalignment. There are no tie rods, no hinged steering connections to become twisted or bent.

Nor do you have the troubles of hydraulic hoists or gravity dumping with these Rear-Dumps. Dump is by an electric winch, that lifts the body up on

twin cables. Operation is under complete control at all times—with positive power for dump and return controlled by an electric switch on the dash. There are no oil seals, hydraulic pumps... no high-pressure lines and jacks to keep tight... no freezing up in cold weather as with hydraulics. There are no shock loads as in gravity dumping. You save on regular maintenance time because there is no hoist mechanism to check... only a few places to inspect and lubricate.

Let us show you how these savings can put money in *your* pocket. For proof, we'll be glad to show you performance figures from a job like yours. Or, if you wish, we'll give you names and addresses of nearby owners of Tournapull Rear-Dumps, so you can check the facts for yourself.

**Model D**— 11 tons, 138 hp

**Model C**— 22 tons, 208 hp

**Model B**— 35 tons, 293 hp

Now available with optional tailgate. Prime-mover also powers interchangeable scraper, bottom-dump, flat-bed, crane, logging arch.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1171-G-b

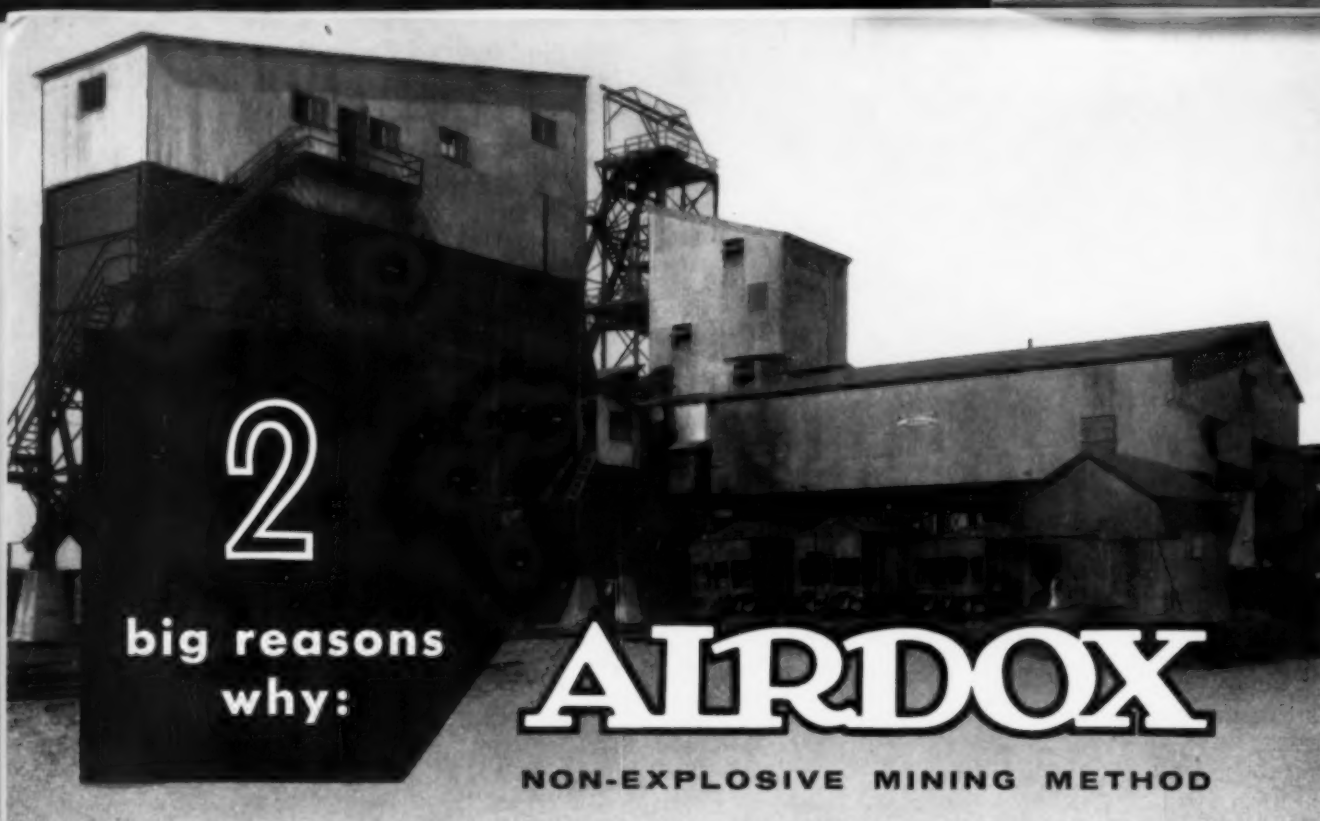


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# 2

big reasons  
why:

# AIRDOX

NON-EXPLOSIVE MINING METHOD

is used at KING STATION MINE

Home of

DEEP VEIN



According to Henry P. Smith, of Princeton Mining Company, AIRDOX Methods are used because...

## AIRDOX

NON-EXPLOSIVE MINING METHOD

**Cuts Costs 5 Ways**

- Produces less fines in face preparation
- Rolls coal forward for faster, easier loading
- Easier on "tender" roofs—cuts timbering, bolting
- Lowers cleaning costs by minimizing fines
- Reduces degradation—no shattered coal

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1

**Safety...** Our miners' safety is uppermost in mind. Also, AIRDOX permits us to shoot while the men are working down below, which is an advantage in the working of the mine.

2

**Preparation...** Deep Vein is primarily a domestic coal and as such must have eye appeal and be able to store with the minimum of degradation—only with the use of AIRDOX is this possible.

HENRY P. SMITH, President  
Princeton Mining Company



**Efficiency of New Sun Rust-Preventive Grease is shown by accelerated test.** Rusty test plate (left) was coated with ordinary grease. The large amount of



rust was formed during a 48 hour immersion in synthetic sea water. Plate (right) protected by new Sun rust-preventive grease is wholly rust free after 48 hours.

## NEW GREASES PREVENT HARMFUL RUST

**Sun rust-preventive greases give improved lubrication  
... protect against wet or humid operating conditions**



**In 48 Hour Synthetic Sea Water Test**, rust from plate coated with ordinary grease has turned water yellow (left). Water remains crystal clear in beaker with plate protected by new Sun rust-preventive grease (right).

Water contamination in grease-lubricated parts reduces lubricant life, promotes corrosive wear, and may lead to failure of bearing surfaces.

Sun Oil's new rust-preventive greases are specially fortified to overcome this problem. They give extra protection against both direct water contamination and indirect water contamination caused by high humidity and condensation during overnight and week-end shut downs.

Available at the price of ordinary greases, new Sun rust-preventive greases come in many different grades. For complete information, see your Sun representative, or write for Sun Technical Bulletin 38. Address **SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-1.**

**INDUSTRIAL PRODUCTS DEPARTMENT**  
**SUN OIL COMPANY**

**PHILADELPHIA 3, PA.**

IN CANADA: SUN OIL COMPANY, LTD., TORONTO & MONTREAL



**PLEASE TURN TO NEXT PAGE**



**New buttery grease** now protects against rust under highly adverse moisture conditions.



**New tacky grease** prevents throw-off...reduces consumption. Highly resistant to water.



**New high-temperature grease** for anti-friction bearings. Exceptional stability, longer life.

## NEW SUN RUST-PREVENTIVE GREASES SAVE YOU MONEY IN 3 WAYS

- Prevent wear... and rust... on 90% of all grease jobs
- • Serve as low-cost rust preventives for storing shop equipment
- • • Save storing and handling special-purpose greases

Sun Oil Company's new greases are fortified to protect against rust. Lubricity is improved and wear is reduced because grease-lubricated parts are now protected at all times against rust and corrosion caused by condensation and process water.

The effective life of these new rust-preventive greases is approximately twice that of conventional greases operating under wet conditions. And, their extra protection against moisture permits their use as a rust-proofing medium for shop storage of tools and parts.

Competitively priced with ordinary greases, these new greases can be applied by any conventional method...brush, swab, pressure gun, or through central pressure systems.

Because of their improved quality, these new Sun greases will now perform 90% of all grease lubrication jobs. You reduce grease inventories...lessen the risk of using the wrong grease...simplify your handling problems.

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# Frozen coal won't build repeat business for you

Freezeproof your coal with Morton "Formula 5" 

It's foolish to run the risk of antagonizing your customers by shipping them frozen coal when it's so easy and economical to freezeproof your coal with Morton "Formula 5."

Morton "Formula 5" is the inexpensive freezeproofing compound made exclusively for the coal industry. Effective even at sub-zero temperatures, "Formula 5" ends costly unloading delays. It keeps coal free-running . . . keeps your customers happy by saving them time, labor and money.

Morton "Formula 5" is economical to apply. It needs no mixing, no extra handling. It's a free-pouring, dry product composed of chemically treated sodium chloride (30-70 mesh) and a special anti-corrosive compound. Just apply dry, direct to the coal.

Look at the advantages of using "Formula 5"

- Low cost of application • Scientifically treated to produce an ideal dissolving rate and minimize loss during initial draining • Will not lump in feeder • Contains a rust inhibitor to protect your equipment • Harmless to coal, harmless to hands and clothing • Can be used for conveyor equipment, switches, tracks, etc. • Readily available—comes in tough, 100-lb. bags.

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# Fast-moving **Jeffrey** produce **650 tons per shift**

**A**T MINNEHAHA MINE of Fairview Collieries Corporation near Dugger, Indiana, old track-mounted Jeffrey equipment has been replaced with two completely new units of modern Jeffrey apparatus, with highly satisfactory results in production.

Each Jeffrey unit performs the complete mining cycle, and it consists of a roof drill, face drill, cutter, loader and two shuttle cars, with a fifth car held in reserve for use

by either unit.

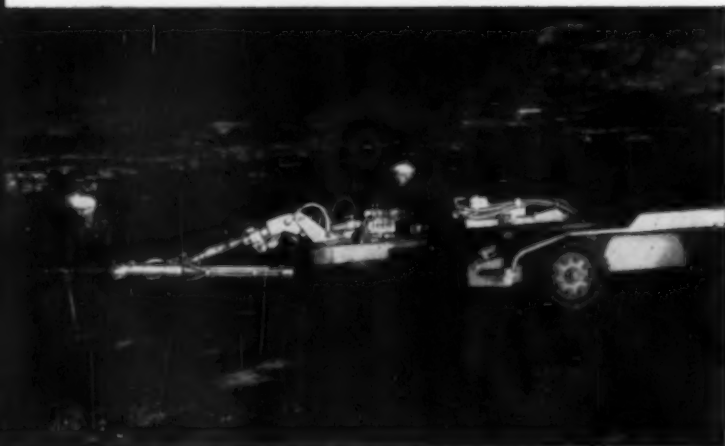
Average output of each unit is 650 tons per shift. Peak tonnages of 830 per shift have been reached. The pictures and captions tell the performance story of the fast-moving Jeffrey machines which constitute each unit.

Find out how this Jeffrey combination can boost *your* production. Call our nearest office. The Jeffrey Manufacturing Company, Columbus 16, Ohio.



*Roof  
Drilling*

The 56-RDR Roof Drilling Machines average 125 bolts per shift, with some shifts reaching as high as 170 4-ft bolts. The mine has changed from timbering to roof bolting for increased safety.



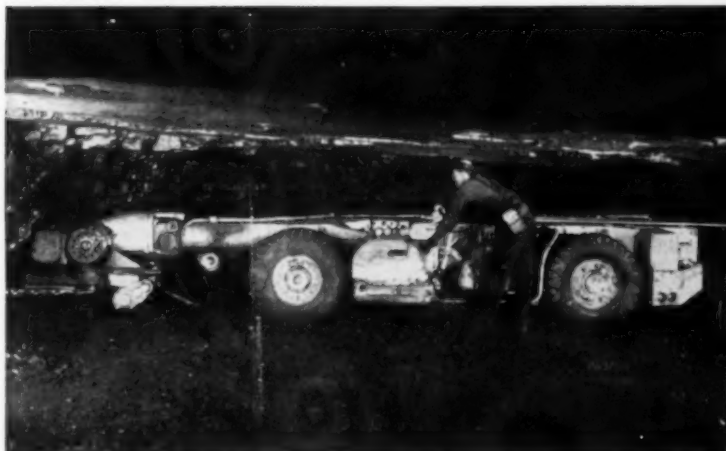
*Face  
Drilling*

The 56-FHR Face Drilling Machines provide excellent flexibility, with heads that can be swung by finger tip control for working anyplace in the face. Drilling range is 7 ft. 2 3/4 in. vertically and 13 ft. 1 3/4 in. horizontally.

# teams for Fairview



The 70-UR Universal Coal Cutters with bug dusters are doing an outstanding under-cutting job at Fairview. Head and cutter bar can be rotated 360° in either direction for any kind of cut, anyplace in the seam. They can make a 30 ft. horizontal cut (using a 9 ft. cutter bar) or a shearing cut 5 ft. 5 in. to either side of center.



Jeffrey 81-A Loaders tram at 137 FPM and can be turned in their own length. The conveyor swings 45° either side of center and elevates to load shuttle cars on the straight or in break-throughs. They are rated at 8 TPM, with maximum of 10 TPM.



Five of these 66-B Shuttle Cars serve the two mining units at Minnehaha Mine. They make fast trips with big payloads from the face direct to mine cars. Features include 4-wheel drive, 4-wheel steering, 4-wheel brakes, hydraulically driven conveyor and cable reel.



• CONTRACT MANUFACTURING



## **JALTEN** gives equal strength with lighter weight.

Jalten steel plates go well with a weld.  
Pre-heating is unnecessary with Jalten—even the weld is a factor in fatigue resistance



## **Low alloy, high strength Jalten offers good formability coupled with excellent corrosion and abrasion resistance**

Jalten's high strength permits high design loads. It also permits a reduction in section when used to replace mild steels. Usually the reduction amounts to two gages affording a weight savings of approximately 25 per cent. Thus, dead weight can be eliminated—resulting in increased carrying capacity. Also, it is easily welded.

Jalten is furnished in four grades:

**No. 1**—possesses high strength, good formability and fabricating qualities—good resistance to low temperature impact.

**No. 2**—offers high strength, moderate formability—improved resistance to atmospheric corrosion.

**No. 3**—gives high strength—improved resistance to abrasion.

**No. 4**—provides superior formability and surface quality for bumper stock applications requiring plating.

Jalten Steels are available as sheets, strip, plates, structurals, bars and small shape sections.



### **SEND FOR THIS NEW BOOK:**

Chemical properties of Jalten  
Mechanical properties of Jalten  
Jalten equivalents  
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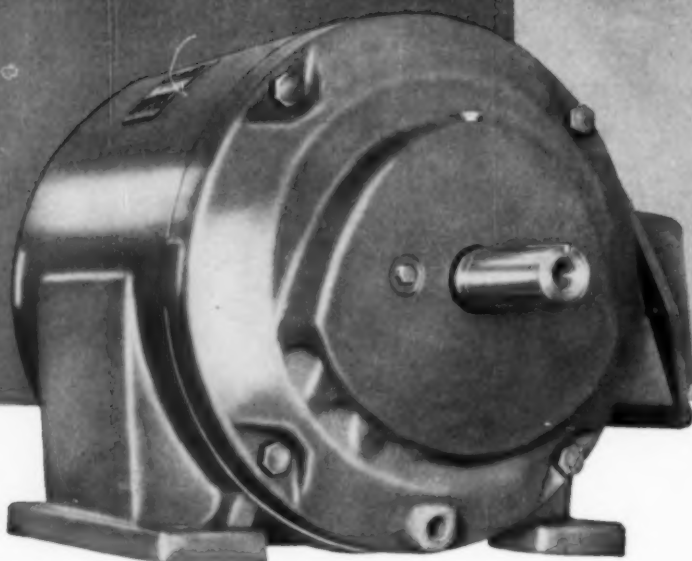
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Barber-Greene Idlers provide extra years of low cost operation . . . the ultimate in belt protection.

## Barber-Greene Idlers . . . still rolling after twenty years

Installed 20 years ago, Barber-Greene Idlers are still rolling at this Material Service Corporation plant in Chicago.

There are no secrets behind the long-life records established by Barber-Greene Idlers. Advanced design plus top-quality materials, plus precision manufacture with the most modern production machines make the difference. The user benefits in lower maintenance costs, less down time, and longer idler life.

Barber-Greene advantages include virtually unbreakable jig-welded base frames, self-shedding base angles, interchangeable rolls made of heavy steel tubing, seamless steel grease reservoirs of ample capacity, and two-degree tilt to facilitate belt alignment.

Whether it's a ball bearing unit for normal service, or a roller bearing unit for the most rugged conditions, Barber-Greene has the idler that's right for any conveyor . . . right for any job.



Available in widths from 16" to 60", with 4", 5", or 6" rolls, the Barber-Greene line includes standard troughing carriers and return rolls, flat belt and picking table carriers, self-aligning carriers and return rolls, grain idlers, rubber impact carriers, and self-cleaning return rolls.

56-22-IPE

Write for literature on the complete Barber-Greene idler line.



# Barber-Greene

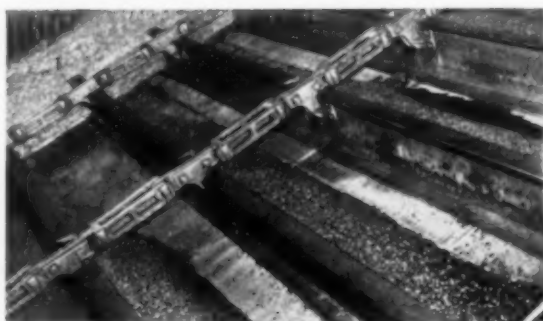
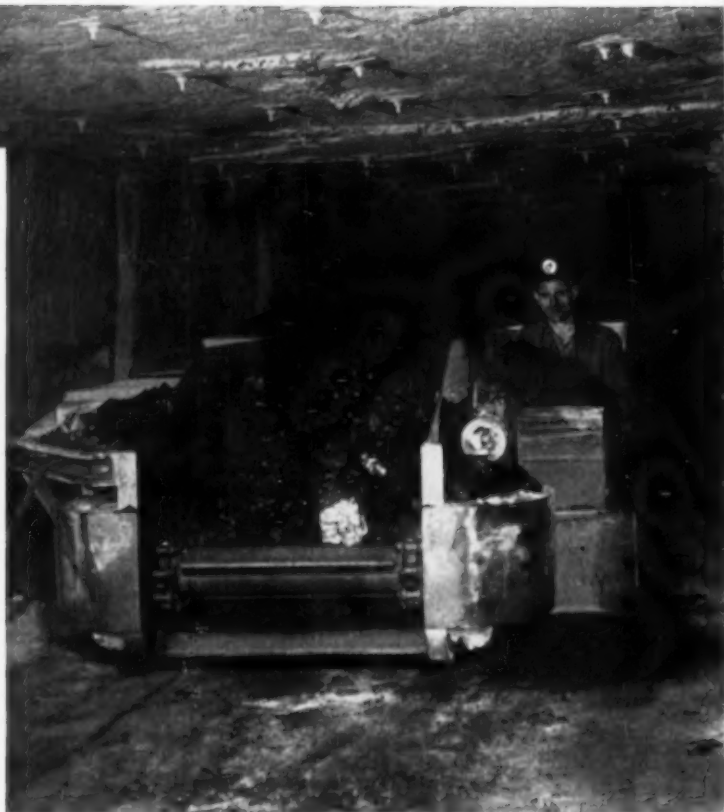
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CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT



**IN HIGH ROOF AREAS** such as the entry shown above, requiring exceptionally strong, permanent roof bolts, Republic's exclusive forged wedge head bolt with rigid expansion shell is ideal. Projecting threaded ends of this assembly, shown above at right, may be used to secure supports for cable or pipe. Also, shown at left is our most versatile assembly, the square head bolt with wedge nut and rigid expansion shell. Rubber washers on the wedge of both assemblies insure strong initial grip on the hole—eliminate spinning or movement of the shields, thus providing a stronger anchor.



**HIGH STRENGTH STEEL ASSURES DURABILITY** of cleaning plant, drag-type conveyor bottom. Handling mixture of  $\frac{1}{4}$ " x 0" fines and refuse subjects bottom to continued heavy abrasion and corrosion. Republic High Strength Steel provides exceptional resistance to both, calling for far less frequent replacement than use of ordinary carbon steel would require. For details mail coupon.

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*World's Widest Range of Standard Steels*

# Republic's complete line assures better bolted mine roofs

Republic, alone, is able to supply all four major classifications of roof bolt assemblies. This complete line versatility lets you select the assembly best suited to your overhead strata conditions for maximum bolted roof security. That's one reason why an increasing number of mine operators are specifying Republic for all of their roof bolting needs.

In addition, each Republic Roof Bolt Assembly classification is subject to exhaustive testing in our own mines before it is ever placed on the market. This procedure, verified by continual observation and study throughout the life of the installation, assures top in-service performance no matter which assembly you require. Types available include the slotted mine roof

bolt, the conventional bolt with expansion sleeve shell, the square head bolt with wedge nut and rigid expansion shell, and the exclusive forged wedge head bolt with rigid expansion shell.

Finally, you can secure the services of a Republic Specialist completely familiar with all types. He will be glad to run tests in your mine and make impartial recommendations covering both type and placement method to provide you maximum, long-term bolted roof security.

Be sure to investigate Republic's complete line when you are ready to order mine roof bolts. Simply contact your nearest Republic Office or mail the coupon for further information.



**PLASTIC PIPE ASSURES CORROSION RESISTANCE** in lines used to handle mine water. Immune to the effects of acids, alkalis and salts commonly found in such service, Republic Plastic Pipe provides service life many times that delivered by conventional piping. In addition, plastic pipe is lighter, easier to handle and install—tremendous advantages in cramped quarters.

**VERSATILE STEEL BUILDINGS ASSURE ECONOMY** in many housing applications throughout the mining industry. For hoist houses, control and equipment shelters, office and personnel buildings and other uses, Truscon® Steel Buildings provide flexibility and economy . . . are quickly and easily erected or dismantled for permanent or temporary use. Mail coupon for information on wide variety of standard designs.



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## SERVICE-SCORE STICKERS provide valuable wire rope facts

... to test performance, speed reordering

For efficient wire rope operation you must have wire rope facts—brief, handy, accurate facts. You need them for safety (when did that line go on?). You need them for reordering (what size is the hoist line?). And you need them most of all for figuring cost (how long did it last?).

But gathering wire rope facts can be time-consuming—unless you have an easy, simple system.

Leschen's Service-Score Stickers provide such a system. The facts are always at hand—on the machine while the wire rope

is working, and in the record book from then on.

Service-Score Stickers make it easy to compare the service you get from various rope constructions, types, and brands, so you *know which one is best* for you.

With the Service-Score System you prove to yourself that Red-Strand wire rope consistently exceeds industry standards for strength and safety.

Write for your starting supply of Service-Score Stickers now—or see your Leschen distributor.

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Rope  
Length \_\_\_\_\_

Rope  
Diameter \_\_\_\_\_

Con-  
struction \_\_\_\_\_

Brand **Red-Strand**

Brand \_\_\_\_\_

Reel  
No. \_\_\_\_\_

Date  
Installed \_\_\_\_\_

Date  
Removed \_\_\_\_\_

Service  
in Hours—Yards—Tons—Miles \_\_\_\_\_

Keep the score  
and you'll use it more.

**RED-STRAND  
WIRE ROPE**

# LESCHEN

**Red-Strand  
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*Keep the score and you'll use it more—Red-Strand Wire Rope*

**LESCHEN WIRE ROPE DIVISION  
H. K. PORTER COMPANY, INC.**

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There's more in this barrel for you...



S. F. Ketcham, Socony Mobil Field Consultant, analyzes oil circulation system design at drafting board stage.

## MORE MACHINE BUILDERS' APPROVALS to help improve production and lower unit costs

Specify Socony Mobil—and you get petroleum products approved by more machine builders than those of any other oil company. And no wonder. Our engineers have always worked closely with designers and builders. They advise on hydraulic and lubrication system design... suggest *correct* products for each machine—to help improve your production, lower unit costs.

Socony Mobil products are also backed

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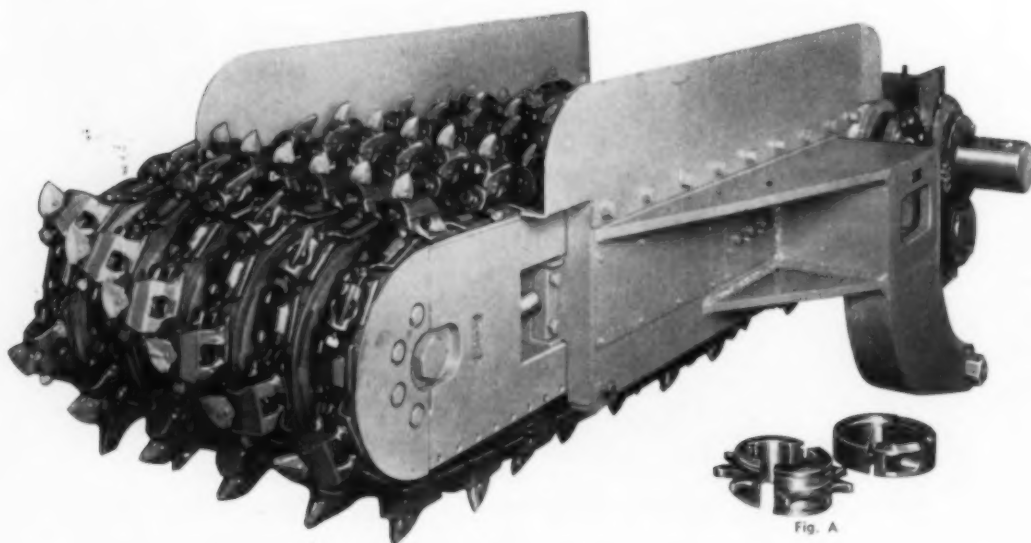


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## **6-IN-ROW RIPPER HEAD**

*. . . incorporating Bowdil Carbide Bits.*



Superior in design and construction, with great strength and rigidity in the shank and clamping method.



### POINTS OF ADVANTAGE:

1. The Bowdil Fabri-Forged Chains, unsurpassed for strength and flexibility. The strongest chain for its size in the field.
2. The Bowdil Ripper Head utilizes 6 renewable, independently adjusted Cutterbars, making it possible to retain equal tension on all 6 chains regardless of their length or age, within liberal limits.
3. Special hard-surfaced wearing shoes in heads of Cutterbars eliminating maintenance on roller and bearings as formerly used.
4. All 6 chains are similar in kerf and lacing arrangement for interchangeability.
5. The chains may be run with or without renewable liners in the Cutterbars as desired.
6. Included in the Ripper Head assembly is a special improved design head drive shaft and sprocket assembly, (see Fig. A) which makes it possible to renew a sprocket in minutes without removing the shaft—(two-piece sprockets are used, held on the double keyed shaft by means of special designed resilient clamping collars, maintaining extreme tension to the shaft).
7. All 6 sprockets are interchangeable.
8. The rear of the Ripper Head frame is arranged with circular shock seats for the drive assembly which normally clears the drive assembly approximately 1/16" to guard against extreme flexing of the drive shaft at overloads. This avoids breaking the shaft.
9. The Ripper Head is complete—nothing else needed from the gear boxes out.

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## He's making a half-hitch for a fast ride . . .

He's connecting a "down" or branch line of Reinforced Primacord at right angles to his trunk line of Plain Primacord. He's using a double half-hitch, *drawn tight* — *because the detonating wave will take this switch at about 4 miles per second!*

This detonating wave is set up in the Primacord trunk line when it is detonated at one end with fuse and cap or electric blasting cap. It travels along the trunk and down to the bottom of each hole, where it initiates the detonation of every explosive in the charge. It's a pretty fast "ride" — but not too fast, because the millisecond interval between holes and rows of holes promotes relief of burden — better fragmentation — easier digging.

Remember, when you detonate with Primacord you can *fire when ready*. Because this detonating fuse is insensitive to sparks, friction, ordinary shock and stray electrical currents. Made in Plain, Reinforced, Plastic Reinforced and Plastic Wire Countered — each designed for a particular purpose.

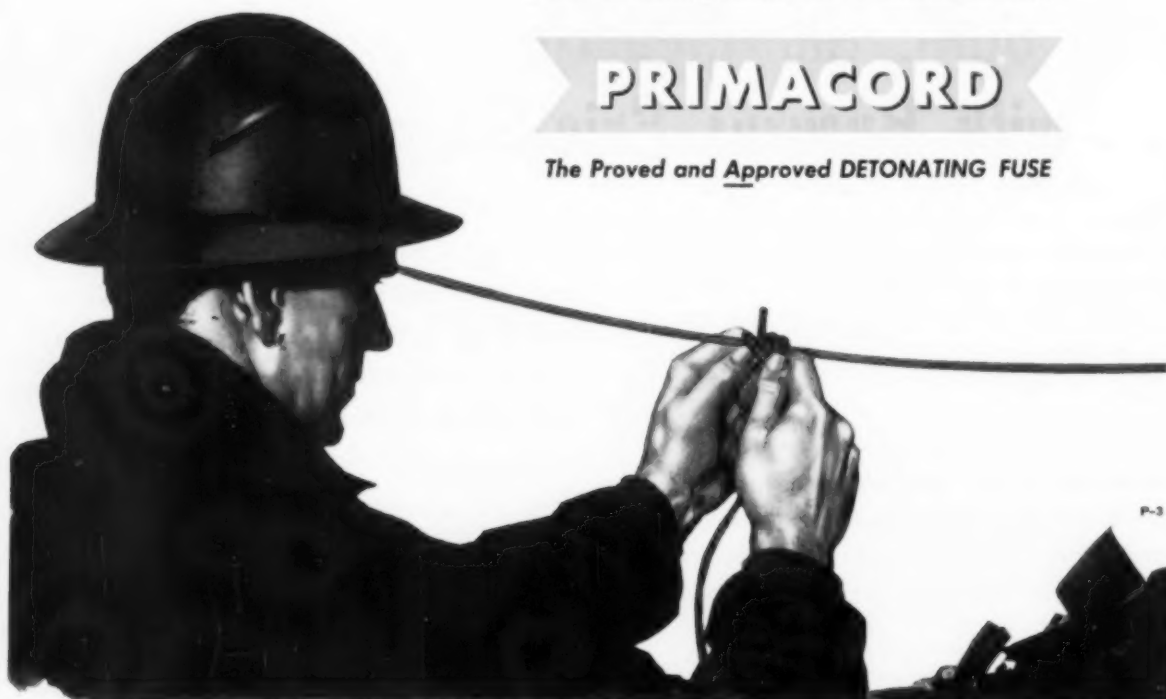
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# PRIMACORD

The Proved and Approved DETONATING FUSE



P-3



DECEMBER, 1956

IVAN A. GIVEN, EDITOR

## Pay-Off Points

THE GOOD TIMES, relatively speaking, that coal is now enjoying, bituminous in particular, still do not alter the basic principle that the better the selling job the better the business and profit picture. In fact, good times, when the money is available, is the time to allocate more to improving the merchandising setup. It is cheering, therefore, to see, among other things, the new program of the Bituminous Coal Institute, which has taken over and expanded the work of National Coal's Market Promotion Committee. BCI's four goals are:

1. Rendering engineering assistance to existing and potential coal users, architects, engineers, etc., through field representatives.
2. Developing sound engineering data, designs, recommendations and general information on efficient coal utilization.
3. Determining the exact extent and nature of coal's potential markets by market research.
4. Fostering public acceptance of coal by advertising and public-relations efforts.

These are the pay-off points. Anything anyone can do to help the program along will make the points pay off quicker and bigger.

## Greater Premium

OBVIOUS WAYS of building for the future for any product are tooling up for maximum quality and minimum cost, plus gearing up the merchandising machine to exploit these advantages to the fullest. Coal's record on tooling, and in the development of methods to utilize these tools effectively, goes back to the early days of the industry. And now, as the preceding editorial indicates, it is building a merchandising machine that will really get results.

Are there other things? "Several" is the answer, but one is perhaps the key to all the rest. It is manpower efficiency, the importance

of which is accentuated by the increase of almost \$5 per day in wage increases and benefits granted in the two years ending next April 1, and by the higher cost of new machines which make these increases possible, provided they are utilized as they should be. Consequently, it is worth repeating again that the future will put an increasingly greater premium on ability to get men to work efficiently, to avoid unnecessary shutdowns for grievances, and to achieve the overall teamwork that will bring the maximum rewards to all. From face boss to president, this should be a major objective in the future.

## Action Quick

"COCKTAIL MIXES" may become a new addition to the language of coal mining as a result of reported departures from the established order in overseas exports. The "mixes," odd-lot nonspecification cargoes, are said to be turning up somewhat more than occasionally as the export boom gathers momentum. They, plus the rise in ocean freights following the outbreak of hostilities in the Near East, are beginning to generate resentment and protests among foreign coal purchasers.

Quality and freight rates are only two of the troubles which can hold back the full realization of the export potential, especially when accompanied by a lack of understanding and confidence among foreign purchasers. American Coal Shipping, Inc., is of course moving to achieve stability in rates, and there is now discussion of the possibility of a new agency to handle the problems of marketing abroad. It would be similar in setup and goals to Bituminous Coal Institute for the United States. And there are other suggestions for protecting and expanding the export market. Action on them all should be quick and to the point, since failure to take steps or the wrong steps can exact a major penalty in lost business in the future.



**HIGH CAPACITY** loader keeps a steady stream of coal flowing to shuttle car at Westmoreland's Hampton No. 3.



**ROOF BOLTERS** follow loader to install 30-in expansion type bolts 4 ft apart. Crew installs 120 bolts in shift.



**TESTING** for methane after blasting and before loading is regular precaution.



**UTILITY CAR** simplifies distribution of supplies in working areas. Mine is laid out with supply track paralleling belts.

## Conveyor Controls Increase

**CONSISTENTLY HIGH OUTPUT** with conventional equipment is being achieved with small crews at Westmoreland's Hampton No. 3 mine near Clothier, Boone County, W. Va. Featuring all-belt haulage protected by interlocked electrical controls, the mine is being developed to produce 4,000 tpd of Hampton No. 3 coal.

Production crews are concentrated in entry development so that the mine can be expanded to the designed capacity as quickly as possible. Crews cut, drill, blast and load an average of 16 cuts of coal in a shift. Each cut of coal is 16 ft wide, 7 ft thick, 8 ft deep and yields 35 tons.

To tap the Hampton No. 3 seam,

the company sunk a 909-ft slope on an angle of 16 deg 30 min with the horizontal. Aluminized steel interlocking panels divide the slope into two sections, one for an air intake and supply road and the other to house the slope belt and reversible man-tow.

New surface facilities, including a 1,600-ton storage silo, screen, crusher and belt conveyors and auxiliary equipment, were installed to link the new mine with the existing preparation plant. Details of the new slope and coal-handling facilities were described in *Coal Age*, July, 1956, p 50.

### **MINING CONDITIONS**

The Hampton No. 3 seam lies 229

ft below the surface at the foot of the new slope and has considerably more cover under the mountain ridges. A 12-ft layer of firm black shale forms the immediate roof. This is overlain with beds of gray shales and sandstones. The coal is 7 ft thick in the vicinity of the slope bottom and averages 59 in throughout the property. The lower 30 in of the seam is soft and friable and is separated from the upper portion by a 6- to 9-in parting of impure coal and fireclay. The upper 24 in of the top bench is marked with minor streaks of sulphur. Fireclay lies under the coal and provides a satisfactory roadbed so long as water is not permitted to accumulate.



MINING PLAN at Hampton No. 3 features all-belt haulage. Main entries are developed with seven headings and secondary entries with five headings.

Sequence controls monitor up-to-date transportation system at Hampton No. 3 to eliminate delays in coal handling. New Westmoreland Coal Co. mine is being developed to provide 4,000 tpd capacity.

## Mining Efficiency

There is little inflow of water into the development work. However, management plans to mine a large area in the lowest part of the property and then use it for a sump for the entire mine. A borehole will be drilled to the low point in the area and it will be dewatered by a deep well pump located on the surface.

### MINING METHODS

Seven headings, 16 ft wide on 50-ft centers, are being advanced in the No. 2 West Main and North Main entries. Breakthroughs are cut 16 ft wide on 80-ft centers. Both development entries are being advanced on a double-shift basis and in the near

future the company plans to add a third-shift alternating between the two entries.

Mining equipment in the No. 2 West Main includes a Joy 11-BU loader, two 10-SC shuttle cars, 11-RU cutter, Fletcher roof-bolter and Jeffrey A7 coal drill with Kennametal augers and bits. Equipment in the North Main includes a Goodman 660 loader, Joy 11-RU cutter, two 6-SC shuttle cars, Fletcher roof-bolter and Jeffrey A7 drill with Kennametal augers and bits.

Section crews are made up of 11 men whose jobs are as follows: two cutter operators, two shuttle car operators, one loader operator, two roof

## Hampton No. 3 Management

General Superintendent	C. J. Robinson
Mine Superintendent	Lawrence Sutton
Chief Electrician	M. H. Coffey
Maintenance Superintendent, DC power	George Auvil
Mining Engineer	W. M. Hanlon
Preparation Engineer	Ersel Evans
Mine Foreman	Basil Jarrell
Night Foreman	M. B. Lynch

bolters, two coal drillers and shooters, one mechanic and a foreman. A belt cleanup man alternates between the two sections and is considered as part of the section crews, half of his wages being charged to each section.

Roof bolts, supplied by W. Va. Steel Co., are 30-in expansion units made of 1040-strength  $\frac{5}{16}$ -in steel. Bearing plates are  $6\frac{1}{2} \times 6\frac{1}{2}$  in. Bolts are installed in the face cycle on 4-ft centers and the two-man crew can bolt 24 places in a shift if necessary.

A row of special plates is used at each intersection to permit the attachment of cable suspension hooks. Each plate has a  $\frac{5}{16}$ -in nut welded to one corner for connecting a hook made from a piece of scrap roof bolt. Hooks are recovered and reused at a new intersection as the headings advance.

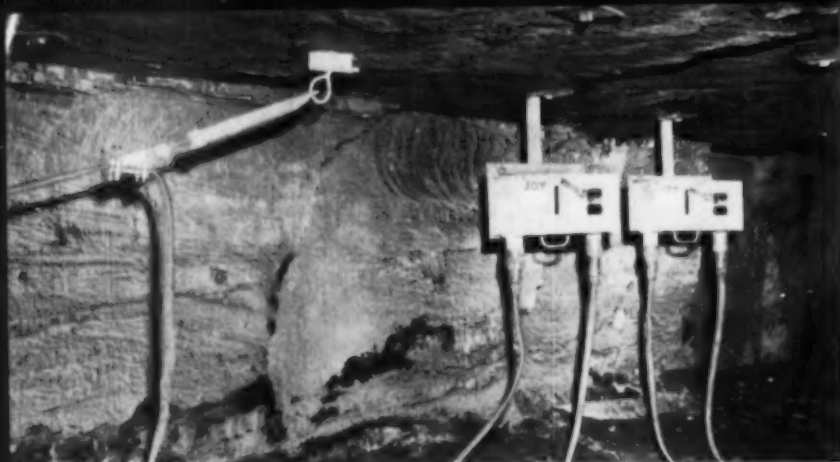
To provide low-cost blasting and at the same time get good loadability, the company takes advantage of the soft nature of the lower portion of the seam. The coal is double undercut to a depth of 8 ft and sheared on the right rib. The double undercut does not produce more fines than a single cut because of the softness of the coal, but it does make it possible to break the coal with a smaller quantity of explosives. The universal cutters have 9-ft bars with 5-position Bowditch chains and throwaway bits.

Three  $1\frac{1}{2}$ -in holes are drilled in each cut of coal. The first hole is drilled 18 in from the left rib and the other two are spaced on 6-ft centers. Three sticks of  $1\frac{1}{4} \times 8$ -in Monobel AA are placed in the left hole, two in the center hole and one in the right hole. The small amount of explosives break the coal enough for easy loading.

### ALL BELT HAULAGE

There are two underground haulage belts in service at Hampton No. 3. In No. 2 West Main there is a permanent unit and in North Main there is a temporary conveyor which will be replaced after the headings have been advanced 2,000 ft.

The No. 2 West Main conveyor is a 36-in Jeffrey 64A unit powered by a 125-hp 440-v Louis Allis motor operating through a two-speed Cleveland Speedaire reducer. Equipped



**POWER SOURCES** for face equipment are mounted on steel hangers which are suspended from roof bolts. Cable anchor also is secured to bolt.

## Two Hampton ideas for improving power distribution and getting longer life from trailing cables



**SPECIAL PLATES** with nut welded on corner hold suspension hooks for trailing cables. Hooks are recovered as mining advances.

with an Ensign starter, the belt may be operated at either 250 or 500 fpm. This belt will be extended 5,000 ft and will be powered by the present drive unit.

Goodrich Caricoal fire-resistant neoprene belt with  $\frac{3}{8}$ -in top cover, including breaker strip, and  $\frac{1}{8}$ -in bottom cover handles the coal carrying job in the No. 2 West Main. The belt is vulcanized into one strip except for one temporary Hayden splice. Each time a 500-ft piece of belt is added, one end of the temporary splice is cut off and the end is vulcanized to the new piece. A new temporary splice then is made to connect the two ends. Vulcanizing is contracted and is done on weekends.

In the North Mains, the temporary 30-in belt will be used to haul coal 2,000 ft. It will then be replaced by a Goodman 36-in unit which will extend 2,100 ft, terminating in by the No. 1 West and No. 2 East Mains.

It will handle the coal from these three development entries. Each of the three entries will have a 30-in belt feeding the Goodman belt.

### AUTOMATIC BELT CONTROLS

To provide protection for all equipment in the coal handling circuit, a system of interlocking electrical controls is used.

Both main underground conveyor controls are interlocked with slope facilities and the preparation plant. For example, the No. 2 conveyor carrying raw coal from the No. 3 mine surface facilities to the screening plant is interlocked with the No. 2 raw-coal conveyor. Everything back to the underground conveyors is interlocked similarly in series sequence.

The main slope, or No. 1 belt conveyor, has an Ensign centrifugal

switch driven by a belt from the 250-hp drive motor. This device was changed from normally-open to normally-closed contacts. When drive speed falls below 600 rpm the contacts open, breaking the electrical circuit. Under the carrying side of the belt near the drive there is another centrifugal switch which has normally-open contacts. If motor speed falls below 500 rpm, the contacts close and interrupt the circuit. These two centrifugal switches operate a control relay governing the motor-control circuit of the slope belt and they must be synchronized.

If the slope belt slips, the control relays lock out and they must be reset before the unit can be restarted. If any part of the belt drive fails the control relay will be locked out.

The No. 3 belt conveyor carrying coal from the 1,600-ton silo to the slope belt also has belt-slip protection. It and the feeder under the silo are interlocked with the slope belt.

To prevent the slope belt from being overloaded by coal being fed to it simultaneously from the silo and the underground bin, two controls were installed 22½ ft downslope from the transfer house. These devices have normally-open contacts which are operated by the load on the belt. If the slope belt is fully loaded either one of the devices will open the control circuit of the belt feeding coal to it from the silo.

When the coal level in the 1,600-ton silo falls to 250 tons, RoBINtronic probes open the circuit to the feeder under the silo. This control insures that a cushion of coal will always cover the steel bottom of the bin.

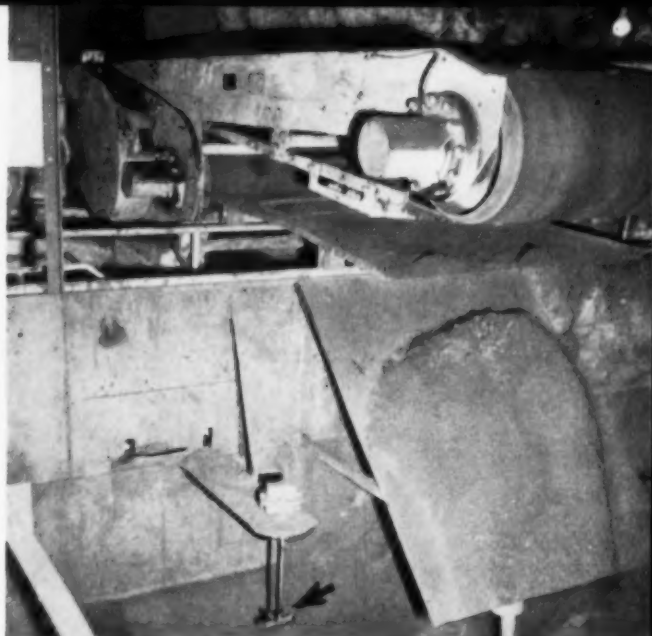
Two independent automatic-control processes are included in the control circuit at the underground bin. These include high- and low-level RoBINtronic probes, a rotary Bindicator which stops the flow of coal if the bin gets too full and a paddle switch in the feeder under the bin. The paddle switch moves a cam attached to a shaft that actuates a microswitch control.

The lower-level probe keeps coal in the bin to serve as cushion while the upper probe starts the feed to the slope belt. As long as everything functions properly in the flow to the preparation plant, and the coal level remains above the lower probe, coal is fed to the slope belt.

If one of the probes should fail, the coal level would build up to the Bindicator which would then stop all conveyors leading to the bin. At the same time an automatic transfer switch would function, changing feed control to the Bindicator and the paddle switch in the feeder chute. This transfer takes place in 30 sec.



**SLOPE BELT** is curved at lower section to permit coal to come to rest before it starts up 909-ft incline.

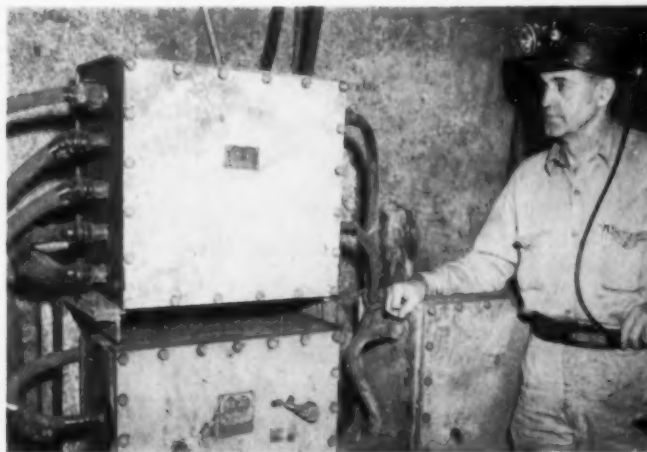


**EXTRA CONTROL** (arrow) prevents overfilling of underground bin if regular devices fail to operate.

### Automatic controls contribute to smooth, trouble-free transportation



**MAINLINE CONVEYOR** is 36-in unit with neoprene fire resistant belt. Unit may be run at either 250 or 500 rpm.



**MAINTENANCE SUPERVISOR** George Auvil inspects underground electrical controls.

If wet coal covers the RoBINtronic probes, the controls function as though the bin is full and the paddle switch takes over control when the bin becomes empty. Any time the probes are cleared and guarantee a circuit, and there is enough coal in the bin to operate the paddle switch, the automatic transfer switch operates and changes the controls back to the probes.

A RoBINtronic probe at the top of the 1,600-ton silo is designed to open the control circuit to the feeder at the bottom of the slope. At the same time a pilot light flashes underground, indicating that the silo is full.

If the slope belt is stopped for any

reason, the mine conveyors discharge coal into the underground bin until it reaches the level of the Bindicator. This device cannot transfer the control circuit if not running.

When the slope conveyor is started an Agastat holds the automatic transfer circuit open for 90 sec. This time interval was selected so the coal would have a chance to clear the Bindicator and thus would not make an automatic transfer to it and the paddle switch.

#### MINE POWER

Underground power is supplied by a 300-kw Westinghouse ignitron rectifier located on the surface. Power

circuits are made up of 1,000,000-cir mil copper cables for both the positive and negative sides, except in the slope where the bonded 60-lb supply track is used for a return.

Future plans call for power boreholes to be drilled near the load center and the substation to be relocated as needed. An overhead pole line will carry 12,000-v AC power to the rectifier which will provide 280 v DC for the mine. The boreholes will be lined with an 8-in casing and 1,000,000-cir mil cables with RH insulation will be placed in the hole. Remote controls at the bottom of the borehole will permit operation of the station from underground.



**THIN-SEAM AUGERING** at Walton Sudduth Co. in southern West Virginia features truck storage of coal. Auger crew spots empty trucks, parks loads headed to preparation plant. Drivers shuttle trucks 3 mi between auger and plant.

## 24-In Auger Produces 150 Tpd

**Efficient trucking undergirds high productivity in augering 32-in seam in West Virginia.**

**Walton Sudduth Co. uses trucks for overnight storage to achieve full-shift operation of augering unit.**

"THE KEY to successful augering of a 32-in seam of coal is having plenty of trucks available so the auger can work uninterrupted." That's the way the Walton Sudduth Co., Oak Hill, W. Va., pinpoints how it is able to produce an average of 150 tons per



**LIGHT-DUTY** cutting head is poised ready to start new hole. Auger penetrates Pocahontas No. 11 coal at 6 fpm.



**STARTED** in new hole, cutting head is ready to receive auger section being pulled from completed hole at right.



**MOVING** to new hole site is easy. Auger helper at left puts wood block under frame. When operator lowers jacks, auger "walks" ahead.

shift with only six men, including truck drivers.

Using a 24-in Cardox auger, Sudduth is recovering the Pocahontas

No. 11 seam in an area previously stripped to an economic limit. By assigning a fleet of seven trucks to the augering job, the company

achieves two goals. First, there are always three spares available to be put in service if one of the four regular trucks should need repairs. Maintenance work can be done on any one of the trucks without reducing the efficiency of the haulage system. Secondly, the trucks provide storage capacity at the ends of the shift when there is not enough time to drive a loaded truck the 3 mi to the preparation plant. At the start of the next shift, the loaded trucks are driven to the bin at the preparation plant.

By using the trucks for overnight storage, the company is able to operate the auger for the full work shift and thereby get maximum production. When the six men arrive in the pit in the morning, there are always at least two loaded trucks waiting. The two loaded trucks are driven to the preparation plant while the augering crew moves the auger into position and starts filling the empty trucks. Thus coal is being mined while the two truck drivers are making a round trip to the bin. It takes 45 min to make a round trip over the twisting mountainside road to the preparation plant.

Four trucks are used regularly by the two drivers. While they drive back and forth to the cleaning plant, the elevator operator spots empty trucks. When a truck is filled, it is driven from under the Haiss elevating con-



**ELEVATING CONVEYOR** transfers coal from coal auger to waiting haulage truck. Conveyor is powered by gasoline engine.



**CUTTING BITS** added to outer edge of 24-in auger section increase recovery in thicker coal.



**EFFICIENT** augering of 32-in seam is achieved by keeping auger working throughout shift. Four trucks handle haulage job, three others provide storage capacity and serve as spares to permit scheduled overhauls.

veyor and parked heading toward the preparation plant. When a driver returns with an empty truck there is a loaded one waiting for him. Thus the two drivers switch from an empty to a loaded truck after each trip. Sudduth's fleet of trucks includes five 10-ton Autocars, one Ford F-600 and one Ford F-800.

#### **PIT PREPARATION**

To keep pit cleanup work to a minimum, and thereby keep non-production costs to a minimum, the company uses an auger that is designed to work in a narrow pit. The width of the pit required is governed by the turning space needed by the trucks rather than by the size of the auger. Sudduth uses a Caterpillar D8 bulldozer to clean the old strip pits and also for road maintenance work as needed.

The Walton Sudduth Co. was organized by Walton Sudduth, who is president of the organization. His two sons, Walton Jr. and Edwin serve as general manager and superintendent, respectively. The company ventured into the stripping business in 1948, at Honaker, Va. From there, the company moved to Matoaka, W. Va. and has been stripping in West Virginia ever since. Contour stripping with light equipment in mountainous areas is Sudduth's specialty.

About 2½ yr ago Sudduth branched out into auger mining near Oak Hill, W. Va. The area was not suitable for

stripping with light equipment but appeared attractive for augering. Since areas suitable for stripping with light equipment are becoming harder to find, Sudduth decided to buy a high-wall auger. The company selected a Cardox unit that would be able to recover the thin seams that could not be strip mined at a profit.

#### **HOW AUGERING IS DONE**

The men in Sudduth's six-man crew are classified as follows: one auger operator; one auger helper; who adds or removes auger sections; one elevator operator and one truck spotter; two truck drivers; and one mechanic.

The auger operator is responsible for positioning and leveling the auger at each new hole. As the auger eats into the coal he observes the quality of the coal dropping onto the elevating conveyor. If the auger should cut into old mine workings, mine roof or floor, he stops the auger and re-levels it or starts a new hole. A 6- to 8-in pillar is left between holes.

The auger is a Cardox Model ECD N-1 unit driven by a Ford FH industrial gasoline motor. Power is transmitted through a Twin Disc torque converter and Cotta transmission. Four 6-in leveling jacks at the corners of the frame permit augering to be done at different levels. The auger rotates at 50 rpm and is thrust forward hydraulically by pressure of 1,000 psi.

Since the Pocahontas No. 11 coal is soft, a 27-in light-duty cutting head

fitted with finger bits is used. It takes an average of 1 min for the auger to advance 6 ft into the coal. A 6-ft auger section can be pulled out of a previously drilled hole and added to the auger in 2 min.

#### **MOVING THE AUGER**

In moving the auger to a new hole, the operator raises the machine on its four hydraulic jacks to the high drilling position. The auger helper then places a 6x6-in by 4 ft piece of timber end up under the drill frame on the operator's side and toward the highwall. When the drill operator lowers the machine, the one corner is held up momentarily by the wooden block. The front end of the machine then "walks" ahead. To complete the move, the rear end of the auger is repositioned similarly. It takes an average of 5 min to move and reset the auger.

Sudduth has drilled to a depth of 180 ft with the 24-in auger. In the present pit the machine is recovering a 120-ft strip of coal between the highwall and old mine workings. In producing 150 tons per shift, the machine drills 12 holes per shift.

To increase coal recovery where seam thickness permits, one auger section has been fitted with three carbide cutting machine bits mounted on the outer edge of the auger section. These bits cut out additional coal as the auger section advances into the Pocahontas No. 11 coal.

# The Coal Commentator

## Orchids to Illinois

October this year was marked by another major safety milestone. It was the third death-free month of 1956 for Illinois, clearly indicating that that state is picking up speed in reducing its injury and fatality toll following the adoption of a new mining code in 1953, and a new resolve by the industry to intensify its safety effort. As a result, Illinois marked up its first fatality-free month in history in 1954 and then showed that it was no accident by repeating to make it two.

Congratulations to management, men and officials in Illinois are clearly in order for a truly significant safety achievement. And the Illinois record warrants careful study by producers and safety authorities in other regions, since the industry as a whole seems to be unable—for the moment at least—to better its 1955 record. It is not, as the Illinois record shows, that further gains cannot be made.

## The Wrong People?

It ain't what it used to be, but its still a big item in bituminous and the mainstay of anthracite—that is, the retail, domestic or space-heating market, whatever the terminology may be. The question for discussion is the basic philosophy in selling this market, which is a goodly source of income even at its present levels. If—and this may not necessarily require passing a miracle—it could be increased, the celebration would be long and loud.

Is the selling in this market being done to the wrong people? This is a question being increasingly accepted as legitimate by those with a present or possible stake in this market. The reasoning? If you have a home owner sold on coal, the dealer doesn't have to be. True, the problem isn't quite as simple as all that, but there is real reason for checking on the basic approach to the problem of building the space-heating market in the home as well as elsewhere. If the study showed that a change was in order, the result could be a better showing for the sales effort and a growing rather than a static or shrinking market in the future.

## Time for Another Look

"The 33 industry groups show no negative productivity changes over the longer period [1899 to 1953]; the average annual rates of gain range from 0.6% in bituminous coal mining to 5.3% in electric utilities."

The preceding appears in "Occasional Paper 53," National Bureau of Economic Research, Inc., 261 Madison Ave., New York 16; price, 50c. The author is John W. Kendrick, institute staff member and professor of economics at George Washington University. Also, among other things, the following:

"Insofar as interindustry differentials in factor remuneration reflect differences in intangible capital and its services per unit of output, relative input of factors toward higher-paying industries result in an increased real input associated with the intangible

investment required to adapt factors to more productive uses."

Your commentator, who had been under the impression that bituminous coal had been doing considerably better than 0.6% per year, hastily turned to the annual reports of the Bureau of Mines to check the record. These reports show tons per man at 3.05 per shift in 1899 and 8.17 in 1953, an increase of 168% per shift and probably more than 269% per hour at the face, which figures out to 3.1 or 5.0% per year.

Note to Professor Kendrick: Maybe another look at the record is in order.

## Fumifugium

"Carbonumque gravis vis, auque odor insinuator.  
"Quam facile in Cerebrum?"—"

Through the kindness of Eugene McAuliffe, who will be remembered for his years of distinguished service to coal before and during his term as president of the Union Pacific Coal Co., and who still maintains a keen interest in industry affairs, your commentator has been afforded the opportunity of perusing a reproduction of a 1661 book on abating air pollution in London. The full title is: "Fumifugium: or the Inconvenience of the Aer, and the Smoake of London Dissipated, Together With Some Remedies Proposed by John Evelyn Esq; to His Sacred Majestie, and to the Parliament Now Assembled," followed in the Latin lines reproduced above.

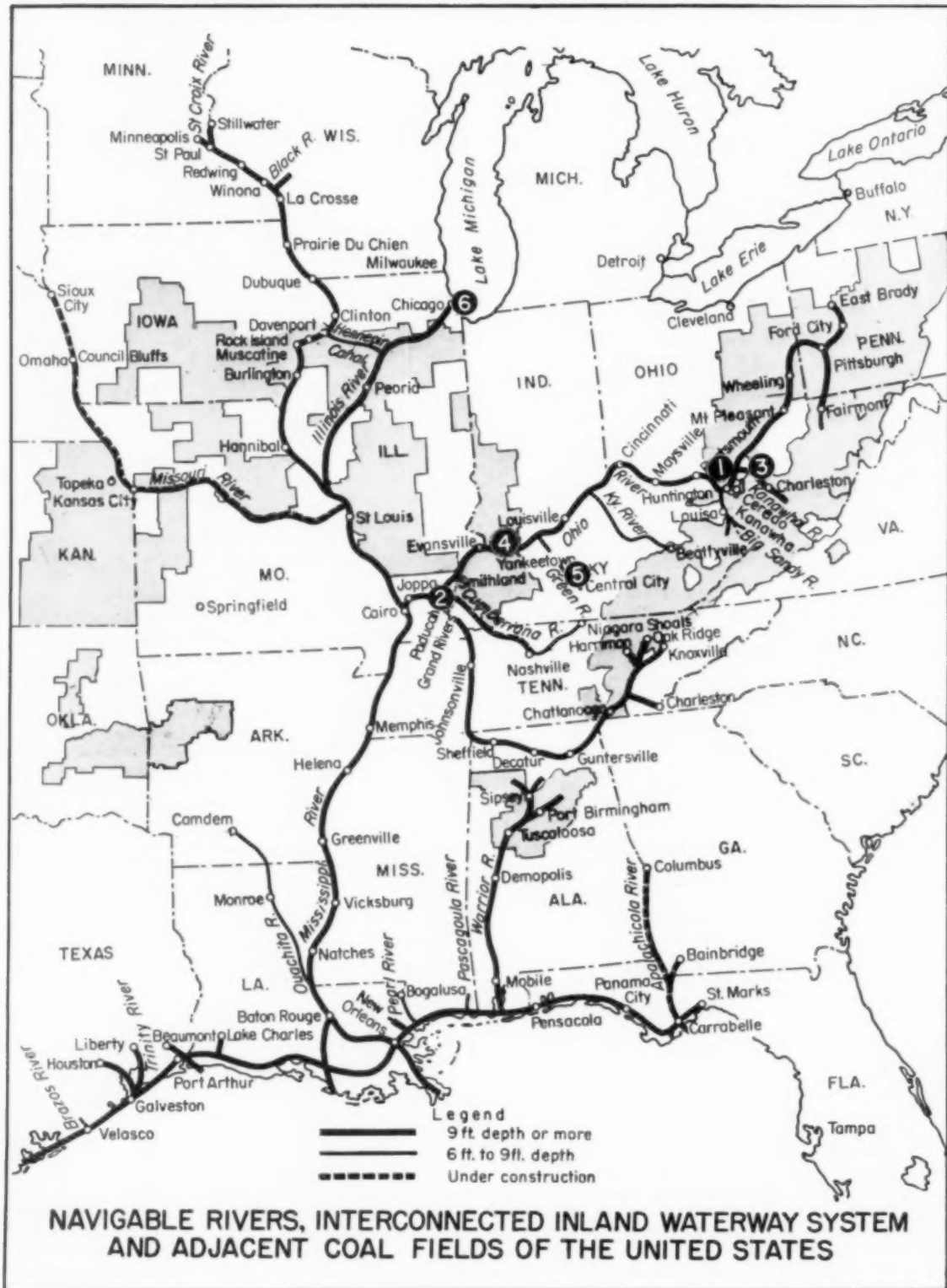
"Sea-coale" was named as one of the major sources of air pollution. But there were others, which means that the situation then was not greatly different than that of today, even though modern science and ingenuity has produced some new compounds to add to those produced by burning wood, coal and other combustibles in 1661. The big difference between then and now is that many people and organizations are looking for solutions to the problem, compared to the lone voice of the reign of Charles. The goal is the proper solution, which is why coal is a participant, not only to forestall discriminatory action but to advance the cause of "Fumifugium" and thus make its own contribution to better living in the United States.

*\*The smoke is heavy, the stink is pervasive.  
Who can think clearly?*

## Not Glamorous But . . .

Bearings have little to offer in the way of glamor, but they can make the life of the coal man smoother or rougher, depending upon how they are specified, installed and maintained. What can be expected when a good job is done? Consider the case of four Timken bearings installed on a 50-hp 900-rpm American Pulverizer coal crusher in Timken's power plant at Gambrius, Ohio. They had run 28 yr without trouble when recently removed and could have gone on. The answer? In three parts: (1) good bearing quality, (2) proper bearing mounting, and (3) careful, consistent lubrication.

# Slick, Low Cost Barge Loading



# Swings Coal to River Transport

C. W. Waterman, Jr., McNally - Pittsburg Mfg. Co. general sales manager, and speaker at the Illinois Mining Institute meeting, describes a trend to water transportation as coal buyers seek to hold down the delivered cost.

MODERN, HIGH TONNAGE barge loading facilities teamed with relatively "high speed river transportation" are giving some coal producers a cost-and-sell edge in today's market. The buyers of large tonnage are looking more and more to operations equipped with river, or rail to river, facilities to furnish the bulk of their tonnage requirements. The reason is simple. Rising rail rates continue to boost the delivered price of coal. But, slick barge loading installations, our nation's rivers, and low barge operating costs easily rival expensive rail and truck transportation. As a result our rivers "teem with high speed mass barge movements," according to C. W. Waterman, Jr., general sales manager of McNally-Pittsburg Mfg. Co., Pittsburg, Kan., and speaker at the 64th annual meeting of the Illinois Mining Institute, Oct. 26, in Springfield, Ill.

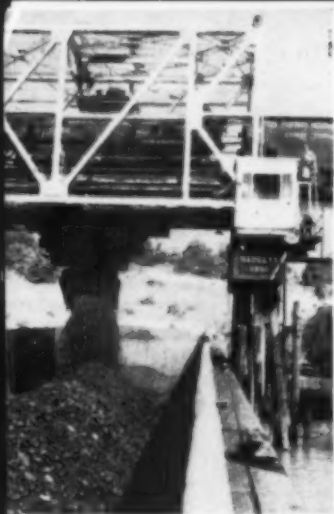
The reduced cost, Mr. Waterman says, "in each and every installation, is reduced manpower which reflects the cost per ton." He says many variables influence costs and make them difficult to pinpoint, but adds that generally they fall between 8 and 20¢ a ton.

So, as a result of high rail costs and low barge costs, coal buyers (with this paramount thought—"keep the delivered cost down") are not necessarily buying at mines with the lowest f.o.b. mine price. Commonwealth Edison, for instance, saved \$1.42 a ton when it used barge hauling in a comparison check with rails between identical points.

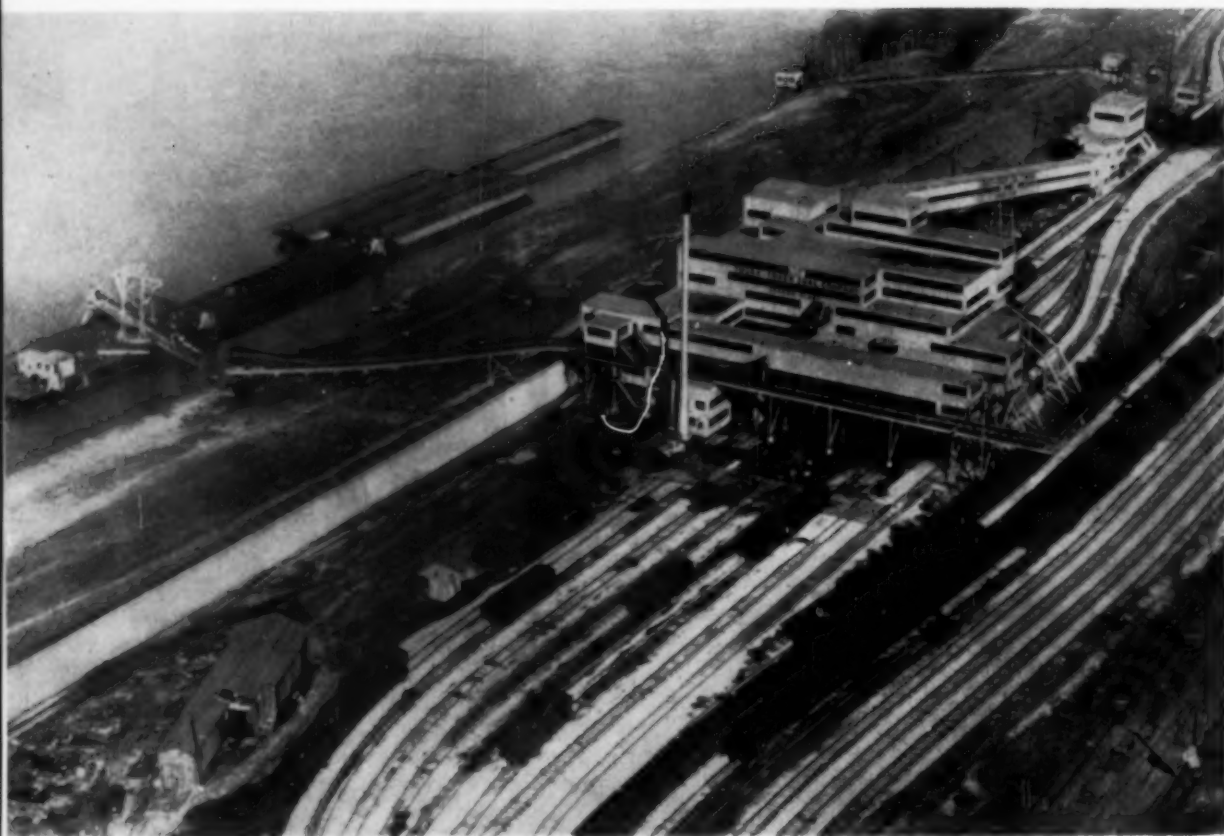
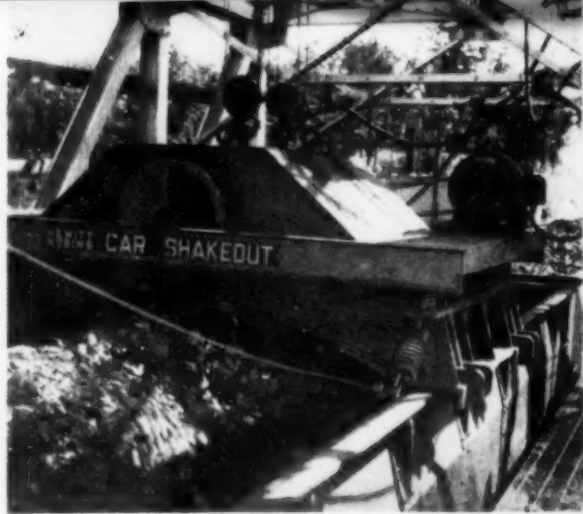
It adds up to this: an old method of moving coal—updated, improved—has been revived because it costs less. The horse drawn river barges of yesteryear are gone—replaced by speedy trucks and trains. But these, too, are beginning to bow where cheap, dependable water transportation is available.



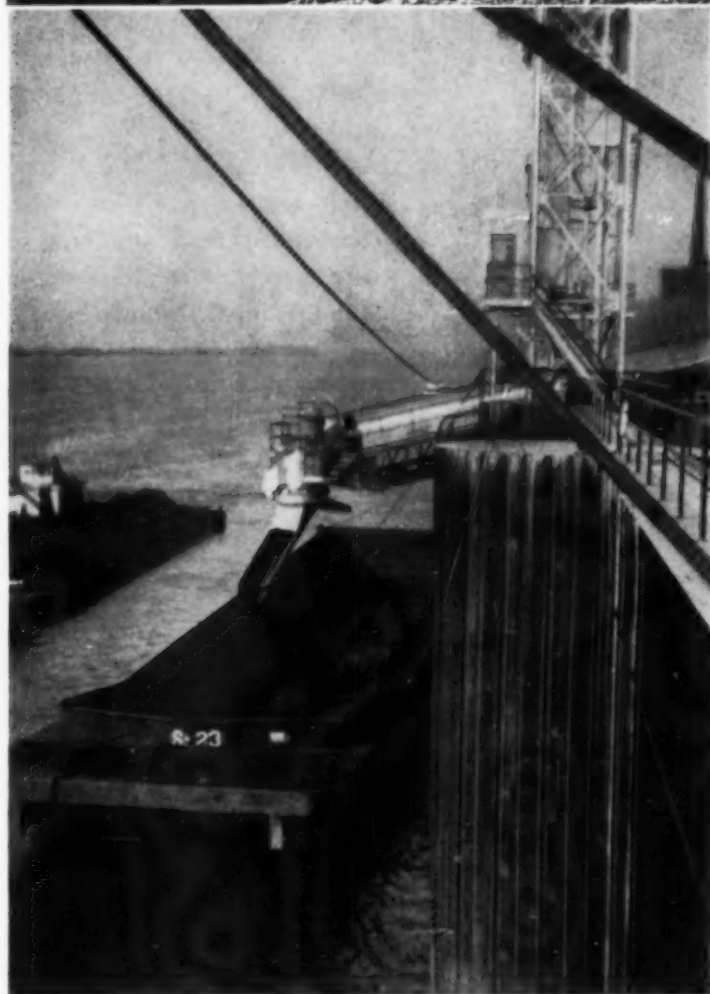
**1.** "The Kenova Terminal barge loading installation was among the first of the elevating boom type barge loaders installed in the Huntington, W. Va., area in 1950. Note the rather utter simplicity of this installation. Coal is dumped from railroad cars to the barge after being transferred by belt conveyor. The boom houses the loading operator."



**2.** "An outstanding example of a simple high tonnage dockloading facility at Grand Rivers, Ky., owned and operated by Badgett Terminal Corp. Fifty-ton hoppers are transferred at the rate of one car in less than two minutes with a vibrating shakeout. On Feb. 16 they loaded 493 cars in 14½ hr — 27,115 tons."



**3.** "Just below Huntington, W. Va., at Ceredo, Truax-Traer Coal Co. owns a barge loading installation, unique because it employs a shuttle loading belt and 'spar barge' to follow the water level from pool to flood stage. The spar barge contains the loading boom and barge positioning hoists. The river belt is under control of the preparation plant operator, the boom belt and barge positioning hoists under control of the spar barge operator. Capacity is 800 tph of 6x0."

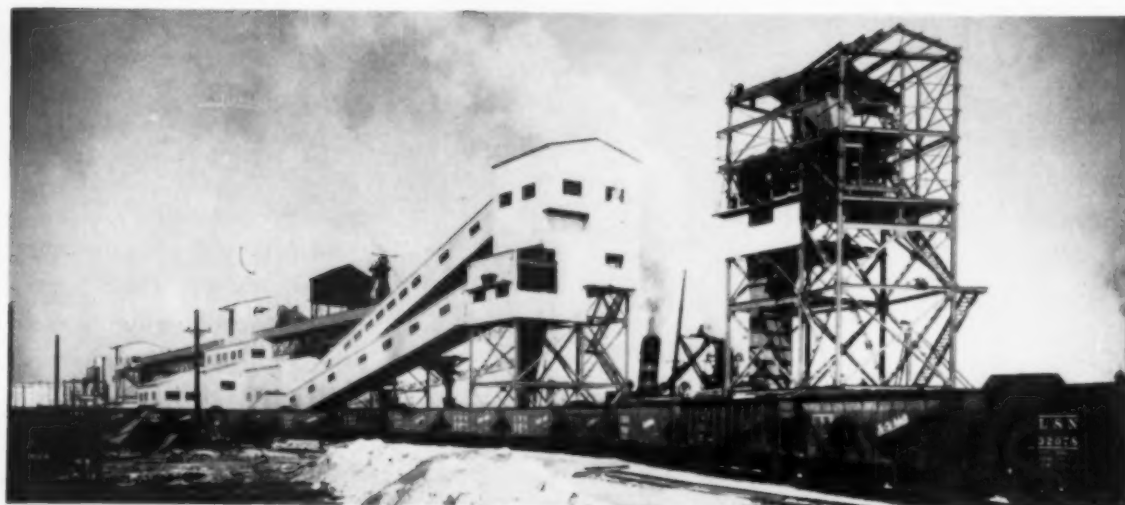


**4.** "Yankeetown Dock Corp.'s installation on the Ohio River provides barge facilities for Ayrshire Collieries' Wright mine 5 mi south of Boonville, Ind., and for Peabody Sinclair operations at Victoria mine, 9 mi south of Boonville. Seventy-ton hoppers are discharged at a rate of 1,500 tph. Broken to 1 1/4 x 0, coal is conveyed to 1,500-ton capacity barges where . . .

. . . the elevating boom permits loading from pool stage to the highest flood stage. The motorized swinging loading spout assures transverse distribution. Feed rate, rotary breaker and main belt are controlled by the dump operator. Total manpower is seven."



**5.** "On the Green River, we see one of the latest additions to the barge fraternity—the Gibraltar Coal Co. plant near Central City, Ky. Above, the tunnel belt is transferring coal from a 5,000-ton washed coal pile to the barge loader at a rate of 850 tph. (*Coal Age*, Oct., 1956, p 60, *Ed.*) A traveling tripper and reversing shuttle belt load any one of eight barges. The telescoping chutes retract automatically."



**6.** "This is the rail to water terminal in Chicago, Ill., on Lake Calumet. Here 3,000 tph

are transferred. This facility serves Illinois, Indiana and western Kentucky."



INDIA'S FIRST coal washing plant uses sand-flotation to process 135 tph of hard-to-clean coal. Plant is located in hilly jungle adjacent to Bokaro River. Aerial tramway 4 mi long carries coal from plant to railroad.

## India's First Cleaning Plant

Need for better metallurgical coal prompts Indian company to erect new preparation plant to handle a difficult washing problem. Rugged terrain complicates design, construction and coal handling.

TO ASSURE consistent and adequate coking coal supplies, India now is using modern preparation methods to upgrade coal from poorer seams. Be-

fore application of modern methods coking coal was obtained only from the better seams which, with hand picking and screening, gave a product

with 12 to 16% ash. But reserves of the better grade coking coals are now insufficient to meet the needs of the growing industrialization of India.

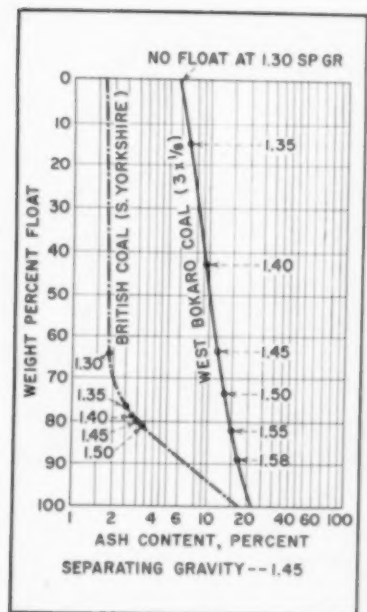
With less coal available from the best seams, the trend was not only to coal with higher ash but variations in ash and quality, which presented difficult problems for steel mills, and adversely affected iron production. Therefore it was imperative that better quality coal be supplied to the mills.

The pioneer in Indian coal preparation was the Tata Iron & Steel Co., Ltd., which prospected the remote areas of the Bihar coal field in search of metallurgical coal. Tata carried out detailed prospecting under difficult conditions in rough terrain in the more accessible areas and located many coking coals over 7 ft thick. On the basis of this information Tata leased approximately 3½ sq mi for the purpose of supplying part of the coking blend at their steel works.

### How actual washing errors compare with guaranteed values<sup>1</sup>

Product	Actual		Guaranteed	
	Error, Wt %	Total Error at Separating Density, Wt %	Error, Wt %	Total Error at Separating Density, Wt %
Sink in clean coal at 1.45 sp gr.....	4.0	6.8	8.0	13.0
Float in middlings at 1.45 sp gr.....	2.8		5.0	
Sink in middlings at 1.60 sp gr.....	5.6	6.4	3.0	5.0
Float in refuse at 1.60 sp gr.....	0.8		2.0	
Total		13.2		18.0

<sup>1</sup>Percentage errors in each case refer to the raw coal input to the Chance cone.



**WASHABILITY CURVE** compares typical British with West Bokaro coal.

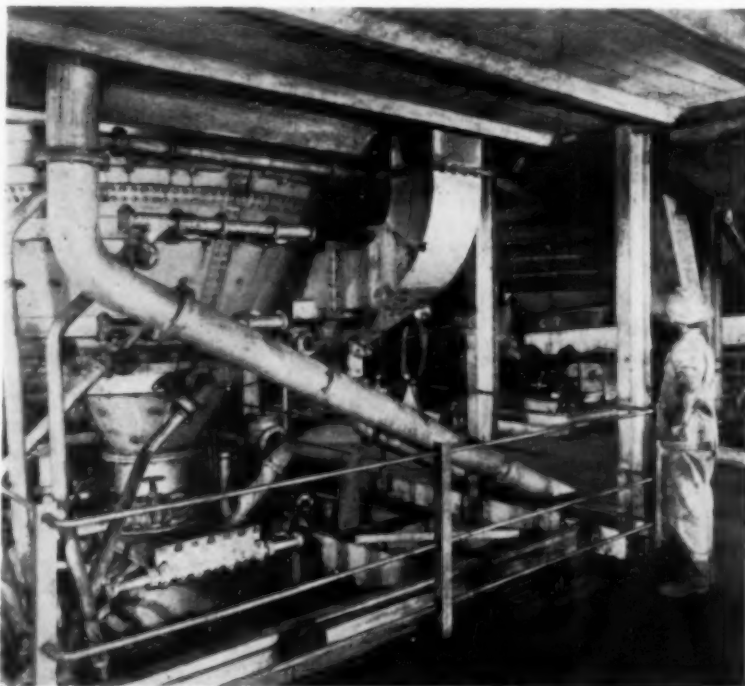


**FIRST STEP** in upgrading coke for metallurgical use is hand picking of 3x1 on plate belt. High ash tends to concentrate in coarser sizes.

A new company, West Bokaro, Ltd., was formed and development of the property was started including a new 135-tph washing plant, India's first. This plant lies 275 mi by road to the northeast of Calcutta. Up to the time that the Tata Iron & Steel Co. became interested in the property in 1939 the coal was used chiefly for purposes other than metallurgical coke because of the high ash and phosphorus content. The remoteness of the plant site and the necessity of basing plant design on bulk samples taken during mine development made the designing and building of the plant more difficult.

Aside from the pioneering nature of the venture, the preparation plant has several interesting features. West Bokaro is located in hilly jungle country adjacent to the Bokaro River. Hills rise abruptly about 250 ft above the river. The nearest existing railroad is about 5 mi away and the shape of the land and the intervening river made application of normal means of transportation impossible. This led to the adoption of an aerial tramway over 4 mi long from the plant to the 1,200-ton loading bunkers at the railroad on a spur siding.

Since the plant site was in hilly jungle with few roads and sparse population a complete village and brickworks for construction of buildings had to be erected. In the initial stages all plant, equipment and materials had to be transported 22 mi



**THREE-PRODUCT SEPARATION** of 3x1/4 is made in sand flotation cone. Crushed middlings are recirculated. Minus 1/8-in coal is relatively clean.

over roads little more than a path.

#### SEAM CONDITIONS

The two coal seams lie in valleys at shallow depths and dip moderately

but variably. Near the plant site the area is cut by a fault which causes the upper seam to outcrop in the bed of the stream on the dip side and on the rise at an elevation of 1,350 ft. There

is an average interval of 40 ft between the two seams.

The plant site was selected to take advantage of the geological features for the installation of conveyors with rotary dumps for both seams. Both the conveyors are equipped with booms for discharging into twin raw-coal bunkers having a combined capacity of 480 tons. The booms minimize breakage and thus avoid excess of fines below  $\frac{1}{8}$ -in and also prevent segregation.

### COAL CHARACTERISTICS

The raw coal at West Bokaro contains 18 to 22% ash which is distributed throughout the entire specific gravity range. Thus, there is no clear demarcation between the cleaner and dirtier fractions. To produce a clean coal of the desired ash content, it is necessary to make a separation at an exceedingly difficult point on the washability curve where the yield is 67% within plus or minus 0.10 specific gravity of the separation density. This, according to the Bird classification, comes under the head of a formidable separation problem. Because the ash is distributed throughout the whole range of the coal, it is impossible to produce a clean coal of less than 7% ash, even with a yield of only 12%.

Fortunately the Indian iron ore is of exceptionally high quality so that it is possible to operate the blast furnaces satisfactorily with coke having an ash content as high as 21% provided its phosphorus and sulphur contents are reasonably low. This necessitates a clean coal with not more than 15% ash. At Bokaro this requires a process that is capable of making an accurate three-product separation if a high percentage of reject, containing a correspondingly high percentage of potentially useful combustible material, is to be avoided.

The finer sizes of the Indian coal are relatively clean. Thus it is possible to screen out the minus  $\frac{1}{8}$ -in size and mix it back with the plus  $\frac{1}{8}$ -in clean coal and still obtain the ash content desired at the coke ovens without resorting to the relatively costly and more difficult problem of cleaning the fines.

Indian coals do not as a rule contain bands of soft shale, but consist of bands of high- and low-ash coal. The high-ash fractions are much less friable than the low-ash portions. Thus the fines produced in the mining operation tend to have a lower ash content than the larger sizes.

### SELECTING WASHING PROCESS

With this condition, it was decided that a dense-medium process was the only one that could accurately sep-

arate the coal into three products. After investigations at home and abroad, the Chance sand flotation process was selected.

Studies also showed that the most economical arrangement, both from the standpoint of yield and capital cost, was to crush the raw coal to minus 3-in and wash the  $3x\frac{1}{2}$  in the Chance cone, mixing the  $\frac{1}{8}x0$  fraction back untreated.

It also was learned that the yield of clean coal could be improved somewhat by crushing the large middlings and rewashing. The plant therefore includes facilities to screen the  $3x1$  from the middlings, leaving the  $1x\frac{1}{2}$  to be loaded out as boiler fuel. The  $3x1$  is crushed to minus 1-in and re-circulated with the raw feed for re-washing.

Engineering for the new plant was handled by the Fraser & Chalmers Engineering Works and its representatives, the General Electric Co. of India, Inc. Fraser & Chalmers also supplied the bulk of the equipment.

### HOW COAL FLOWS

Maximum input to the 12-ft Chance cone is 127 tph. Coal is delivered to the dump in mine cars and is discharged into two apron feeders. These discharge to belt conveyors, which are fitted with adjustable booms to deliver the raw coal into the two raw-coal bunkers, one of 190-ton and the other of 290-ton capacity.

This arrangement, aside from even- ing out the feed to the washery, enables some blending of the coal to be done if desirable. The raw coal bins are each fitted with a Sherwen electromagnetic vibrating feeder which may be adjusted to deliver 50 to 135 tph each. Coal is delivered to the main raw-coal conveyor on which it is weighed automatically before it is discharged onto the triple-deck primary screen which sizes it into plus 3-in,  $3x\frac{3}{4}$  and  $\frac{3}{4}x0$  fractions.

The plus 3-in fraction is delivered to a plate picking belt, while the  $3x\frac{3}{4}$  is deposited onto a belt conveyor for delivery to the Chance cone. Meanwhile the  $\frac{3}{4}x0$  is discharged into a Redler conveyor which delivers it to a 4x10-ft Sherwen unit for dry screening at  $\frac{1}{8}$  in.

The  $\frac{1}{8}x0$  may be discharged directly into the dust bin for loading as a separate product or to a Redler conveyor for mixing with the  $3x\frac{3}{4}$  clean coal. If it is not desirable to clean the  $\frac{3}{4}x\frac{1}{2}$  facilities have been included whereby all  $\frac{3}{4}x0$  may be delivered down the back of the Sherwen screen hopper and thence either directly into the dust bin or to the clean-coal conveyor.

After the large rock, tramp iron and

other impurities are removed from the plus 3-in raw coal as it moves along the picking belt, it discharges onto a Pennsylvania single-roll crusher for reduction to  $3x0$  and routing to the washer.

In event of the washer being down for any reason, the conveyor feeding it may be reversed and the coal delivered to the middlings bin for disposal by the aerial tram.

Clean coal from the Chance cone is dewatered and desanded on a slow-speed screen. Middlings are recovered from a point midway down the cone by means of a middlings column and dewatered and desanded similarly to the clean coal. Refuse is drawn off at the bottom of the cone by automatic air-operated gates. A special feature of the three-product separation is that by a simple operation, taking only a few minutes, the cone can be adjusted to make a two-product separation to meet the changes in the characteristics of the raw coal or for market requirements.

Cone refuse, after desanding and dewatering, is discharged onto a 36-in refuse belt which also receives the hand-picked refuse. The combined refuse flows to a refuse bin from which it is removed by a Sherwen feeder which discharges onto a mine-type conveyor with an extending head. This conveyor discharges into a valley a short distance from the plant. This valley was selected because no coal seams outcrop on its slopes.

Clean coal, after dewatering and desanding, is delivered to a double Redler conveyor which also is arranged for receiving  $\frac{1}{8}x0$ , delivering the mixed product to the washed-coal bin. The section of this conveyor immediately over the bin is arranged with a continuous open discharge so that the bunker may be self trimming.

Middlings are dewatered and desanded on a separate middlings screen which also sizes them at 1 in. The  $1x\frac{1}{2}$  is discharged directly into the middlings bin while the  $3x1$  material flows to a conveyor and thence to a second Pennsylvania roll crusher for reduction to minus 1 in. This crushed material is then recirculated for re-washing.

### OPERATING RESULTS

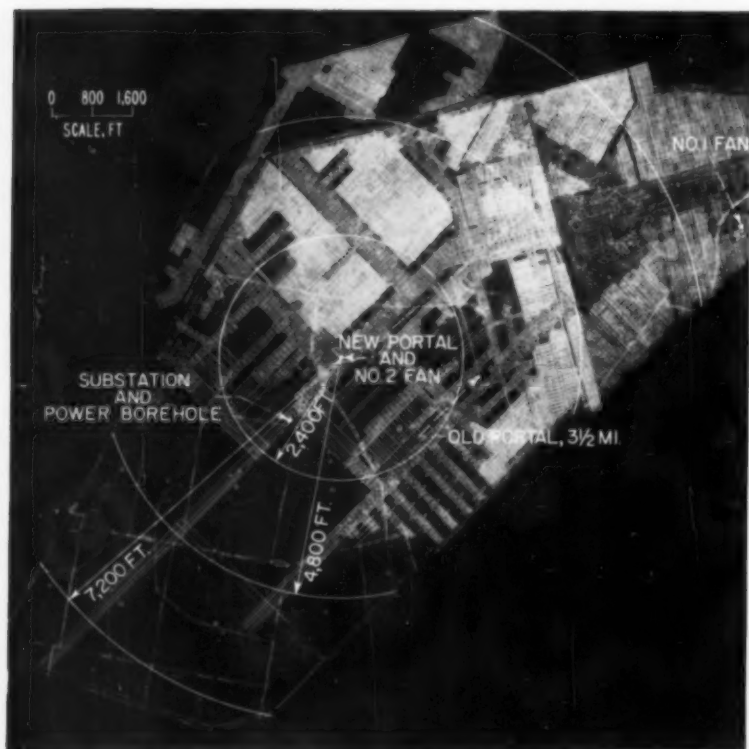
Results of a test made soon after the plant went into operation show that the percentage of errors are well within the guarantees with this extremely difficult coal.

Sand consumption was also within the guaranteed figure of 3 lb per ton of raw coal. No difficulty was experienced in obtaining a natural sand of suitable grading, without any prior classification being necessary.



STERLING COAL CO.'S new field portal resulted in an immediate increase in productivity by reducing travel time 54 min per shift. The facility also serves as a new field airshaft into solid reserves at this extensive mine.

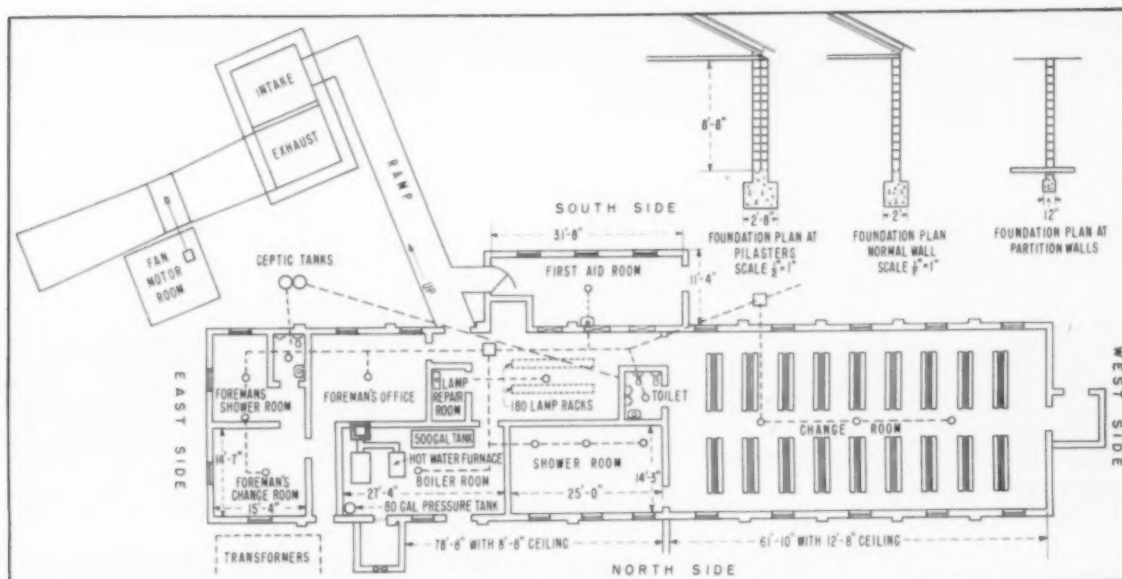
## New Portal Increases



AT THE HUB OF ACTIVITY in Sterling's plans, the shaft penetrates the lower Kittanning seam in an area having a projected life of from 25 to 28 yr at present rates of production. A new power borehole serves the area.

Sterling Coal Co.'s field portal, airshaft and power facilities in an area of solid reserves will lead to top operating efficiency in sections having projected life of 25-28 yr.

A \$450,000 INVESTMENT in a new portal has provided an additional boost in efficiency at Sterling No. 1 mine, Sterling Coal Co., Elmora, Pa. The chief advantage is that 54 min per shift has been cut from travel time, resulting in a direct gain in productivity of 1.8 tons per man day soon after the new shaft went into service.



**PORTAL BUILDING** provides for comfort and convenience of employees and supervisors. Ample parking space and a service station are provided near the building.

## Productivity

Furthermore, the new portal is centrally located with respect to solid reserves. This will make it a vital facility in Sterling's operation over the next 25-28 yr at present rates of production.

Equally important are the safety benefits. The substantial reduction in travel time means that the men no longer are exposed to the haulage and roof hazards of long rides in mantrips. The most distant workings in the area to be served by the portal will be approximately 8,200 ft from the shaft, as shown on the accompanying map of the area.

Over the past 5 yr Sterling's top management has invested time, effort and money in modernizing its mine in northern Cambria County, as described in an article in the August, 1953, issue of *Coal Age*. The portal is one of the major features of the program.

Actually, the full-scale portal is an outgrowth of Sterling's need for a new airshaft. It was realized early in the expansion and modernization program that increased ventilating capacity would be needed to serve the reserves which were about to be opened. Excessively-high water-gage levels and a consequent increase in power requirements would be encountered if an attempt was made to ventilate the

new areas using No. 1 fan alone. Since a new airshaft had to be sunk, it was decided to provide an Otis automatic elevator and build the necessary surface facilities to realize the

portal advantages previously mentioned.

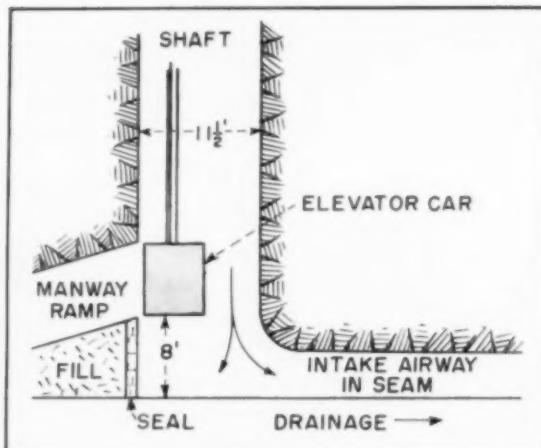
With the new portal in operation, the duty at the two exhaust fans is as follows:



**J. E. LAMONT**, safety director, conducts first aid and mine rescue training sessions in this well-equipped first aid room in the portal building.



**ELEVATOR LANDING** at foot of shaft is 8 ft above bottom to isolate men from cold intake air and to promote better drainage. Filled ramp leads downward from landing to floor of the seam. This arrangement eliminates need for sump.



## Worker comfort rates top consideration at



**SELF-SERVICE LAMPROOM** is another feature of new portal building which contributes to higher overall efficiency. A lamp-repair room also is provided.

No. 1 Fan—113,825 cfm against 3.5-in w-g.

No. 2 Fan—135,535 cfm against 1.7-in w-g. This new fan at the field portal is a 6-ft Jeffrey Aerodyne Type 8H72.

Ample parking space for employees' cars and a service station are provided near the new manshaft. Other facilities are a washhouse, a self-service lamphouse, a first-aid room, foreman's office, boiler room and auxiliaries as shown in the floor plan. Spring water is impounded in a 605,000-gal reservoir to supply the portal building. A chlorinator inside the building treats all incoming water. The facilities now are used by 212 men. However, there are 260 baskets in the changeroom and there is room for further expansion.

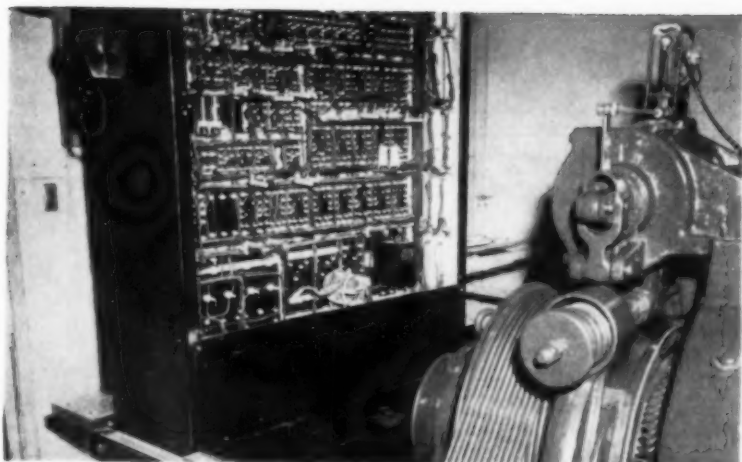


**WAITING ROOM** is shielded from strong intake air currents, to eliminate wintertime problems. Man trips are made up in adjacent heading.

The two-compartment shaft is 449 ft deep. Dimensions of each compartment are 11 ft 6 in by 9 ft 8 in, and the separation between compartments is an 8-in brick curtain wall. The upcast side of the shaft is topped by the housing of the exhaust fan. The downcast (intake) side contains the automatic elevator.

The Otis elevator requires no attendant. The car carries 17 men per trip and is controlled from a push-button panel inside the car. Depressing a single button initiates the action of the doors and starts and stops the hoist motor at the top of the head frame.

Full responsibility for maintenance of the elevator rests with trained service men of the Otis Elevator Co. Sterling and Otis are parties to a main-



**SOUND-POWERED TELEPHONES** (side of control board) insure uninterrupted communications with elevator car. Others are in elevator car and office.

## Sterling's new 449-ft shaft



**NEW SUBSTATION**, equipped with mercury arc rectifier, feeds DC power through borehole to new mining area to insure proper voltage at face.

tenance contract, thus insuring the best service in the interest of safety. A full inspection by an Otis expert is made once each week and around-the-clock emergency service is available, if needed. As an added safety measure, the company has installed Wheeler sound-powered telephones in the elevator car, in the foreman's office and in the control room at the top of the headframe. These interconnected units require no external power since they are actuated by the voice of the person speaking. Therefore, uninterrupted communication with men in the car is assured, even in the event of a total power failure.

Since the elevator car operates in the intake compartment of the shaft,

special arrangements had to be made to eliminate, as much as possible, interference of the car with the air current in the shaft. Accordingly, the landing at the top of the shaft is raised 8 ft above ground level. This 8-ft portion of the otherwise covered headframe is a screened opening which permits the intake air to enter under the car and flow down the shaft. The car would act as a regulator if this was not done. The men walk up a ramp from the lamphouse to the loading platform to board the elevator.

Similarly, at the foot of the shaft the landing is 8 ft above the bottom, and the men use another ramp to walk down to the level of the bottom of the seam. This is done to permit the man-

way to be sealed from the intake air current. In the winter the intake air is frigid but the protected manway is much more comfortable. This arrangement is shown in an accompanying diagram.

Provision is made in the control scheme of the elevator to have the car complete its full cycle at the top. After the men leave the car at the foot of the shaft, the doors of the car close and the car automatically returns to the top, where it comes to rest above the screened intake opening. The car is in the airstream only when it is actually traveling in the shaft, and even then it occupies only about half of the effective area of the compartment.

The elevated landing at the foot of the shaft has another distinct advantage in that it eliminates icing problems. The raised landing provides access to the shaft bottom for inspection and removal of ice, if it should accumulate. Furthermore, a sump is not required, since water drains away along the bottom rock of the seam.

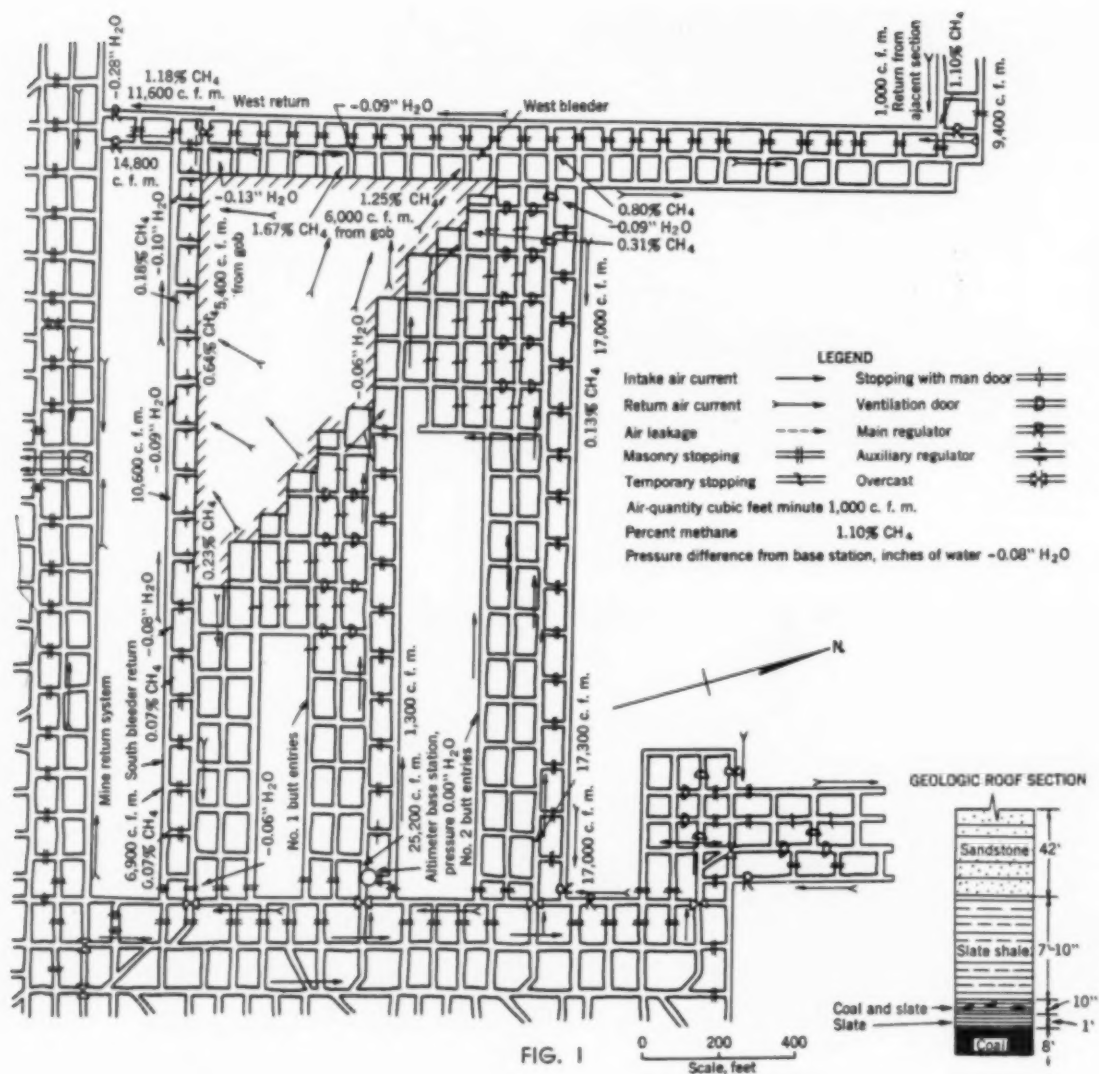
Most of the portal construction work was done by Sterling Coal's own men and by local contractors. The shaft was sunk and lined by Williamson Shaft Contracting Co., Columbus, Ohio, with James Williamson, Indiana, Pa., in charge. The top coping is 29 in of reinforced concrete for a depth of 24 ft. The remainder of the shaft is lined with 12 in of concrete.

Griffith-Custer, Johnstown, Pa., provided the steel for the portal buildings, which were erected by Sterling employees under the supervision of Adrian Buck, construction engineer for the coal company. Gerald Kirsch was contractor in completing the portal building. Electrical work was done by company electricians supervised by John Buck, chief electrician. Plumbing was done by Long Hardware Supply Co., Ebensburg, Pa.

The new portal provides access to reserves in the 42-48-in Lower Kittanning (B) seam, which is mined in some areas by conventional trackless mechanical units and in others by conveyor methods.

Col. Robert B. Baker is president of Sterling Coal Co. with headquarters in New York, N. Y. The Philadelphia, Pa., office of the company is headed by John W. McGinn, executive vice president. John A. Bradley is assistant to the president, Thomas F. Minton is secretary-treasurer, and Thomas Guineven is purchasing agent.

Dennis J. Keenan is general superintendent and T. J. Lamont is assistant superintendent, with headquarters at Elmora, Pa.



## Are Bleeder Entries Effective?

Bleeder-entry ventilation of pillar areas can be effective in controlling dangerous accumulations of explosive gas, provided they are well planned and reasonably clear of obstruction.

By DONALD S. KINGERY, Assistant Chief  
Mine Ventilation Section, U. S. Bureau of Mines,  
Pittsburgh, Pa.

THE USE OF SPECIAL RETURN ENTRIES bordering and connected to pillared areas to bleed air-gas mixtures from worked-out sections has been advocated by State mining departments and the Bureau of Mines for many years. The accepted terminology, "bleeder" entry or entries, means special returns, developed and maintained as part of the ventilating system to drain air-methane mixtures from pillared areas into the mine return circuit. This is usually accomplished by controlling the direct returns from the pillar line by regulators and thereby forcing a certain quantity of air through the gob into bleeder returns, or else by establishing returns on two or more sides of the pillared area to drain methane from the gob edges.

A report presented first at the October 24 session of the Coal Mining Section, National Safety Congress at Chicago, Ill.

The use of bleeder systems, however, has not become general practice, and the effectiveness of such special returns under varying conditions of roof has been a controversial subject among coal-mining officials.

This paper summarizes the result of 5 of 8 field studies by the U. S. Bureau of Mines to test the effectiveness of active bleeder ventilating systems used in gassy mines in Pennsylvania, West Virginia and Indiana. A detailed report describing all tests will be published later by the USBM. It was not practicable in the survey to study all possible coal-mine conditions likely to be encountered. Undoubtedly there are conditions where bleeder entries, even though properly planned and maintained, may not operate satisfactorily. Consequently, the scope of this report is limited to physical conditions and operating practices similar to those encountered during these tests.

The field work consisted of ascertaining the quantities of air entering and returning from each test area, and in traveling the bleeder entries to determine the air flow through the bleeders and to collect samples of mine air in the bleeder returns. In addition, the pressure drops across the gob from the working area to various points along the bleeder return system were measured with precision altimeters. This information made it possible to trace the air flow through the gob, and to determine the extent of methane drainage from the gob. Following is a description of the test areas:

## DESCRIPTION OF TEST AREAS

### Mine A (See Fig. 1.)

This test was conducted in a large mine operated in the Pittsburgh coal bed. The mine gives off approximately 4,500,000 cu ft of methane in 24 hr. The area consisted of two sets of working butt entries. The extent of the pillar area was about 1,000 ft on the south and 800 ft on the west, with a stepped pillar line approximately 1,300 ft long. The total caved area was computed to be about 500,000 sq ft.

A single entry along the south served both as a bleeder and return air-course from the area. This bleeder return was connected to the mine return system through a regulator near the southwest gob corner and was separated from the gob by concrete block stoppings in which holes had been made as the pillar line retreated to permit air flow from the gob.

The west bleeder return system consisted of both a bleeder entry open to the gob and a parallel return entry separated from the bleeder by concrete block stoppings. At the south end bleeder and return were connected by a regulator, whereas at the north end the bleeder return joined the direct return. This system of control permitted air flow in the bleeder entry toward both the north and south regulators.

The bleeder and return entries had been roof-bolted

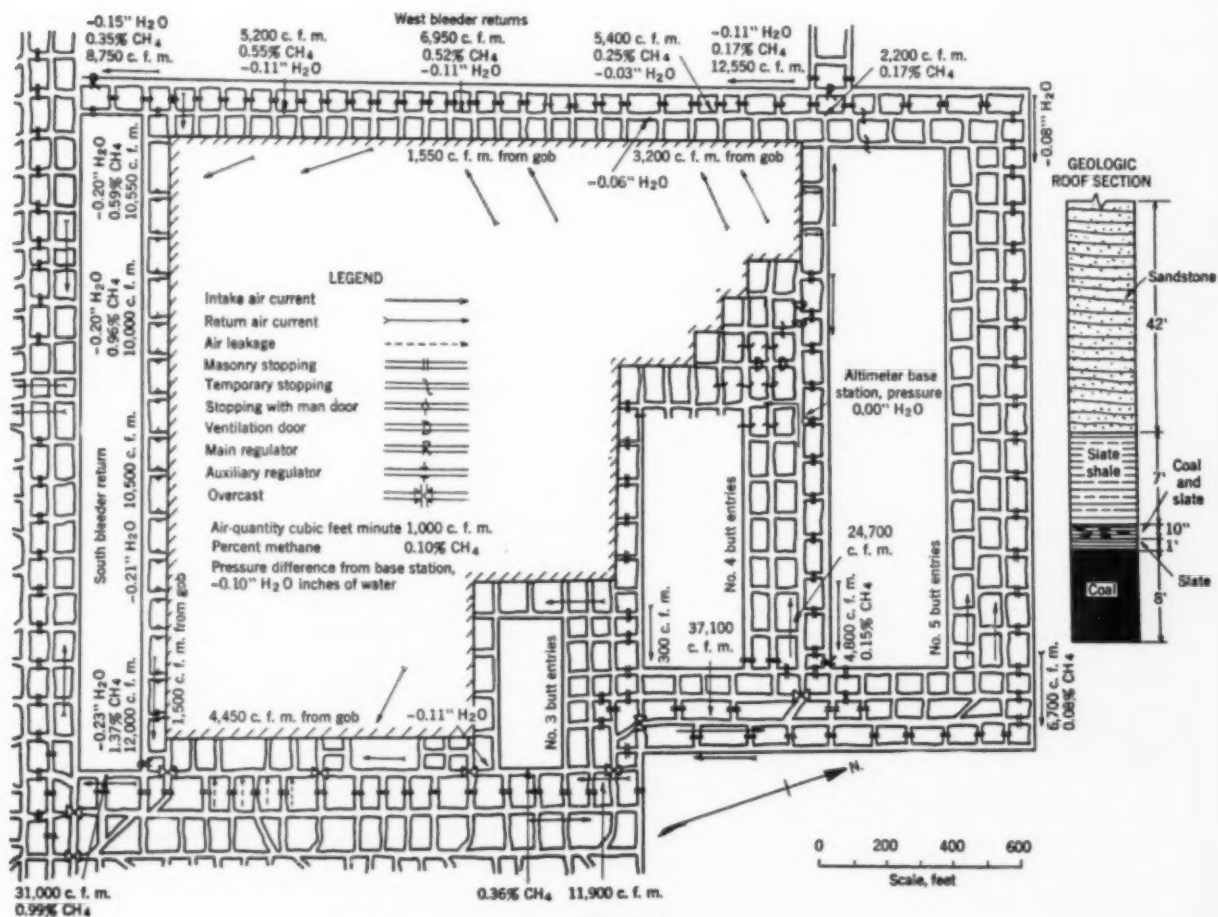


FIG. 2

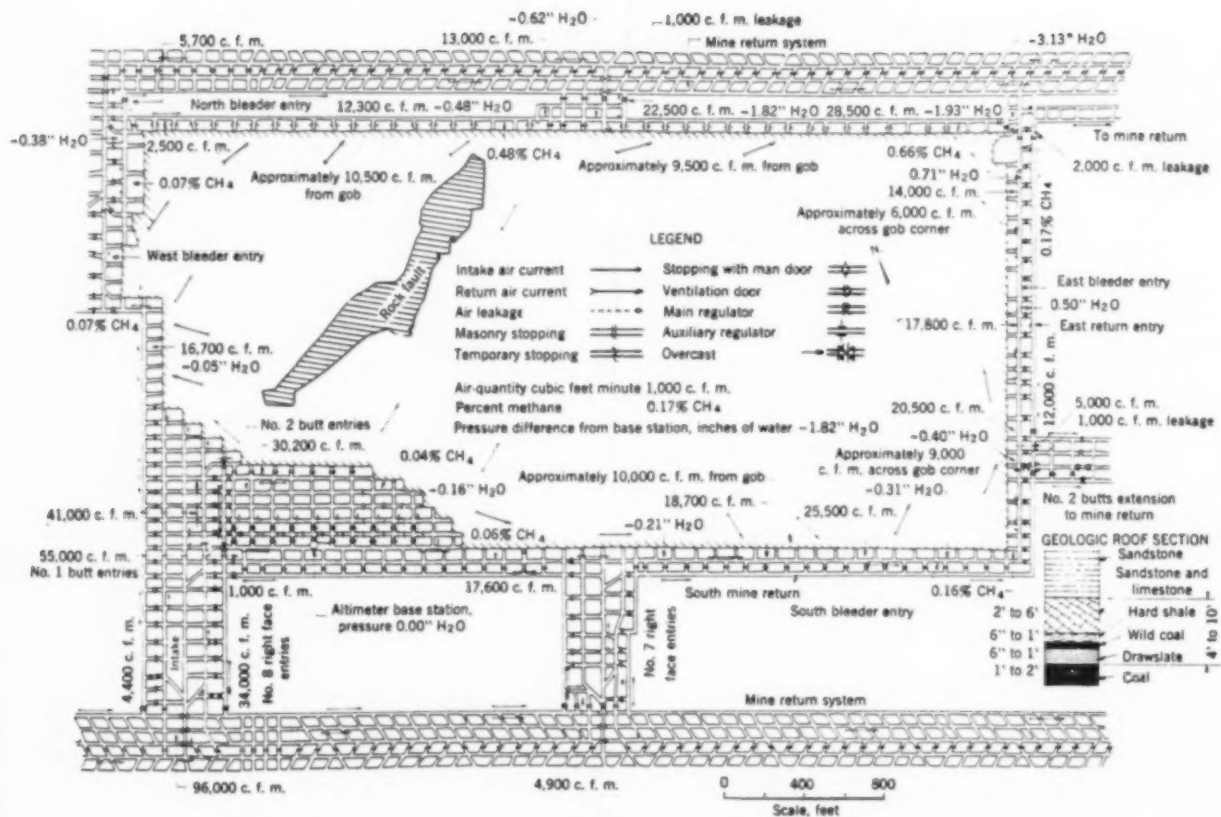


FIG. 3

throughout, and a few center posts had been placed where heavy roof was indicated. It was possible to travel completely around the gob area without difficulty.

Intake air entered the section through both Nos. 1 and 2 butt entries and was controlled at the pillar faces by a system of doors and temporary stoppings to provide a split toward each pillar-line corner. Air flow to the southeast corner entered the south bleeder entry, while that to the northwest corner had two direct returns, one through the No. 2 back entry and the other through the return paralleling the west bleeder.

The quantity of air ventilating this area was 43,500 cfm. This included 1,000 cfm which entered the west return from an adjacent section. The quantities of air measured at the bleeder intakes totaled 11,300 cfm and included 6,900 cfm to the south bleeder, 3,400 cfm to the west bleeder, and 1,000 cfm from the adjacent section. At the southwest gob corner 26,400 cfm was found to enter the mine return system. The difference between bleeder intakes and returns (15,100 cfm) was thought to have passed through some portion of the pillared area. This was equivalent to 35% of the quantity of air delivered to the section.

Analysis of the pressure data collected showed pressure drops from midpoint of the pillar line to the gob corners of 0.02 to 0.03 in and to the southwest gob corner of 0.07 in of water. These small pressure differences evidently were sufficient to induce air flow through the shallow and open gob.

The results of analysis of the vacuum-bottle air samples collected showed a maximum methane concentration of 1.67% near the southwest gob corner in the west bleeder. A progressive increase in methane content occurred in

the south bleeder, while in the west bleeder the higher percentages of methane were due to the fact that all air entering this bleeder had passed through the gob, while in the south bleeder only 54% of the air passed through the gob.

The ventilating currents were removing approximately 175 cfm of methane from the area of which 140 cfm was from the gob interior. This was equal to 201,600 cu ft of methane each 24 hr or 40,300 cu ft of methane per 100,000 sq ft of gob area per day.

#### Mine A (See Fig. 2.)

This test was made approximately one year later in the same area described in Fig. 1. During this interval, 3 additional butt entries had been driven, and the pillared area had been increased from approximately 500,000 to 2,500,000 sq ft. Bleeder entries were arranged as previously described, except that now air flowed south only, in the west bleeder return and east instead of west in the south bleeder, which now carried gob air to a junction with a new southeast direct-return connection with the mine return circuit. This new direct return was open to east end of the gob area.

The west bleeder and parallel return entry were caved at this time, making them difficult and hazardous to travel. Numerous falls also had occurred in the south bleeder entry. Roof-bolt support in this case had been inadequate to support the heavy unconsolidated roof.

The gob had fallen very tight, and very little air was thought to pass through the main body of the gob. The air flow measured was flowing along the gob fringes, along the partly open bleeders, and across the gob corners.

Intake air now entered through Nos. 4 and 5 butt entries. That entering No. 5 Butts passed directly to returns without ventilating producing entries. Of the intake air from No. 4 Butts ventilating the pillar line, part returned down the back entry of No. 4 Butts, part entered the west bleeder return, and the balance crossed the gob to the south and west bleeder entries and east return.

The quantities of air entering the area totaled 37,100 cfm. In all, 26,250 cfm was entering the return system without crossing the gob. However, most of this air was returned past the pillared area through bleeders or gob-connected returns and assisted in methane drainage. The balance (10,850 cfm or 29% of the air delivered to the area) entered the gob and flowed across gob corners or gob fringes to the bleeder returns.

Analysis of the pressure data collected showed again that this area was operating with relatively low pressures. The drops across the gob to the southwest and southeast gob corners were, respectively, only 0.20 and 0.23 in. of water. Small pressure drops such as these probably were not sufficient to induce air flow across the main gob which now was very tight. However, they did induce the flows measured across gob corners and gob fringes.

The results of analysis of air samples showed the maximum methane concentration to be 1.37% at the south-east junction with the mine return system. A progressive increase in methane content was evident along both the south and west bleeders. The ventilating currents were removing approximately 340 cfm of methane from the area, of which 296 cfm came from the gob. This was equivalent to 426,000 cu ft of methane each day, or 17,000 cu ft per day per 100,000 sq ft of gob area. By comparison, during the previous test of this area, only 201,600 cu ft of methane was given off each 24 hr, equivalent to 40,300 cu ft of methane per day per 100,000 sq ft of gob area.

#### Mine A (See Fig. 3.)

This test was conducted in the same mine described in previous tests 1 and 2. The area consisted of two sets of working and three sets of completed butt entries. The extent of the pillared area was approximately 5,000 ft on the north, 2,300 ft on the east, 3,100 ft on the south, and 1,500 ft along the west, with a stepped pillar line approximately 2,100 ft long. The total caved area was computed to be about 10,000,000 sq ft.

A single entry on the north, connected to the mine return system at both the east and west ends, served as a bleeder entry through connections to the gob through auxiliary regulators made by knocking small holes in concrete block stoppings that had been installed during development work. The west, east, and south bleeder entries had open connection to the gob area. Parallel return entries, separated from the bleeders by concrete block stoppings, served as returns for the bleeder entry along the east side and as part of the mine return system around the southeastern part of the gob area. The west bleeder entry joined the north bleeder at a common northeast junction.

The north and west entries had been supported by wooden crossbars and posts and had fallen in numerous places. The east and south bleeder entries had been partly roof-bolted and center-posted and were passable without difficulty.

The large gob area provided a severe test of bleeder efficiency, since it was very tight and contained a large rock fault that obstructed air flow.

Intake air that reached the pillar line was either returned directly to the mine return circuit through the No. 8 right face returns or else entered the west or south bleeder system with a small part entering the gob.

The total quantity of air entering the area was 96,000 cfm, of which 38,400 cfm was immediately returned without entering the bleeder returns. The balance, 57,600 cfm, it was assumed, passed through or by the pillared area. Of this quantity, 20,100 cfm was measured entering the bleeder returns; consequently 37,500 cfm or 39% of the intake air passed through gob. Probably only a small part of this 37,500 cfm actually passed through the gob interior; most of the air traveled the gob fringes. However, the fact that air flow could be traced moving across gob corners and through the gob fringes assured that the potential hazard of a sudden release of an explosive mixture of methane into active workings had been reduced.

Analysis of the pressure data collected showed pressure drops across the gob of approximately 1.8 in. to the northeast corner with a pressure drop along the north bleeder of 1.55 in. between intake and return. The drop across the regulator at the northeast connection with the mine return was 1.2 in.

The results of analysis of the air samples collected showed the maximum concentration of methane to be 0.66% near the northeast gob corner. Progressive increases in methane occurred along the bleeder returns showing the methane drainage to be effective. The ventilating currents were removing about 235 cfm of methane from the area, of which 215 cfm, or 310,000 cu ft each 24 hr, was removed from the gob, a quantity equivalent to 3,100 cu ft a day for each 100,000 sq ft of gob area.

#### Mine B (See Fig. 4.)

This test was conducted in a mine operated in the Pocahontas No. 4 coal bed located in southern West Virginia. The mine was giving off approximately 5,000,000 cu ft of methane in 24 hr. The area consisted of 4 sets of butt entries, 3 completed and 1 active. The extent of the pillared area was about 1,800 ft on the north, 1,600 ft on the west, and 2,600 ft on the south, with active mining along the east side. The total caved area was computed to be approximately 3,300,000 sq ft.

Bleeder entries were established along the north, west, and south boundaries of the pillared areas. These bleeder headings were interconnected and were connected to the mine return system near the southwest gob corner and also at a location midway along the west bleeder. The north and west bleeders were open to the gob; masonry stoppings had been placed between the gob and south bleeder entry except near the southwest gob corner. At the time of the survey most of these stoppings were crushed to the extent that air was leaking through them into the bleeder entry.

The bleeder headings had been supported by wooden crossbars with extra posts set where poor roof was indicated. This method of support appeared adequate for the north bleeder, which had suffered only a few falls. Although efforts had been made to keep the south bleeder open by setting cribs, it was badly caved. The west bleeder also was badly caved. However, because of the open type of falls, air movement through the bleeder entries was good.

Intake air was controlled at the working faces by means of line brattice and check curtains and after ventilating the pillar faces passed through the southeast gob corner into the south bleeder system.

In addition to the intake air entering the section, approximately 49,100 cfm of return air that had been used for development on another section was returned through No. 4 Butt to the north bleeder entries. Of this return air, 31,100 cfm was found to enter the gob from the north bleeder. The quantity of air that actually passed through some part of the gob was determined by subtracting from

the total intake of 88,400 cfm a total of 21,200 cfm for the quantities of air that did not enter the bleeder returns through the pillared area. This quantity, 67,200 cfm, was 76% of the air delivered to the area.

#### Mine C (See Fig. 5.)

This test was conducted in a mine operated in the Pocahontas No. 4 coal bed and giving off approximately 8,000,000 cu ft of methane in 24 hr.

The area consisted of one set of operating butt entries with the pillared area 1,200 ft by 1,700 ft along the north and south and averaging 500 ft along the east and west sides. The total caved area was computed to be about 1,100,000 sq ft.

Bleeder entries were established along the four boundaries of the gob. These bleeder entries were connected at common junctions. The combined system was connected to the mine return circuit through the west bleeder at the northwest corner of the area. The west and south bleeder entries were separated from the gob by heavy wooden stoppings reinforced by brattice cloth. These stoppings had held up exceptionally well. Very few were crushed completely; most however, were sufficiently crushed to permit air leakage from the gob.

Intake air was split after reaching the section. One split of 19,300 cfm passed directly into the north bleeder,

where it was checked by doors and forced into the gob. The balance of intake air was used to ventilate the pillar faces after which most of it crossed the southeast gob corner to the east and south bleeders. The air quantities measured in the bleeder entries and thought to pass through some part of the gob were:

38,000 cfm to the south bleeder.

7,300 cfm to the west bleeder across the northwest gob corner.

16,900 cfm to the east bleeder across the southeast gob corner.

62,200 cfm total.

This 62,200 cfm of air was approximately 82% of the intake air to the pillar line.

Analysis of the pressure data collected showed pressure drops of 0.83 in and 0.45 in between the pillar edge and the wide and narrow portions of the gob. The pressure drop to the junction between the west bleeder and mine return measured 1.00 in, with a drop of 2.35 in across the regulator.

The ventilating currents were removing approximately 831 cfm of methane from the area, of which about 815 cfm was from the gob. This was equivalent to 1,174,000 cu ft of methane per day, or 107,000 cu ft for each 100,000 sq ft of gob area each 24 hr.

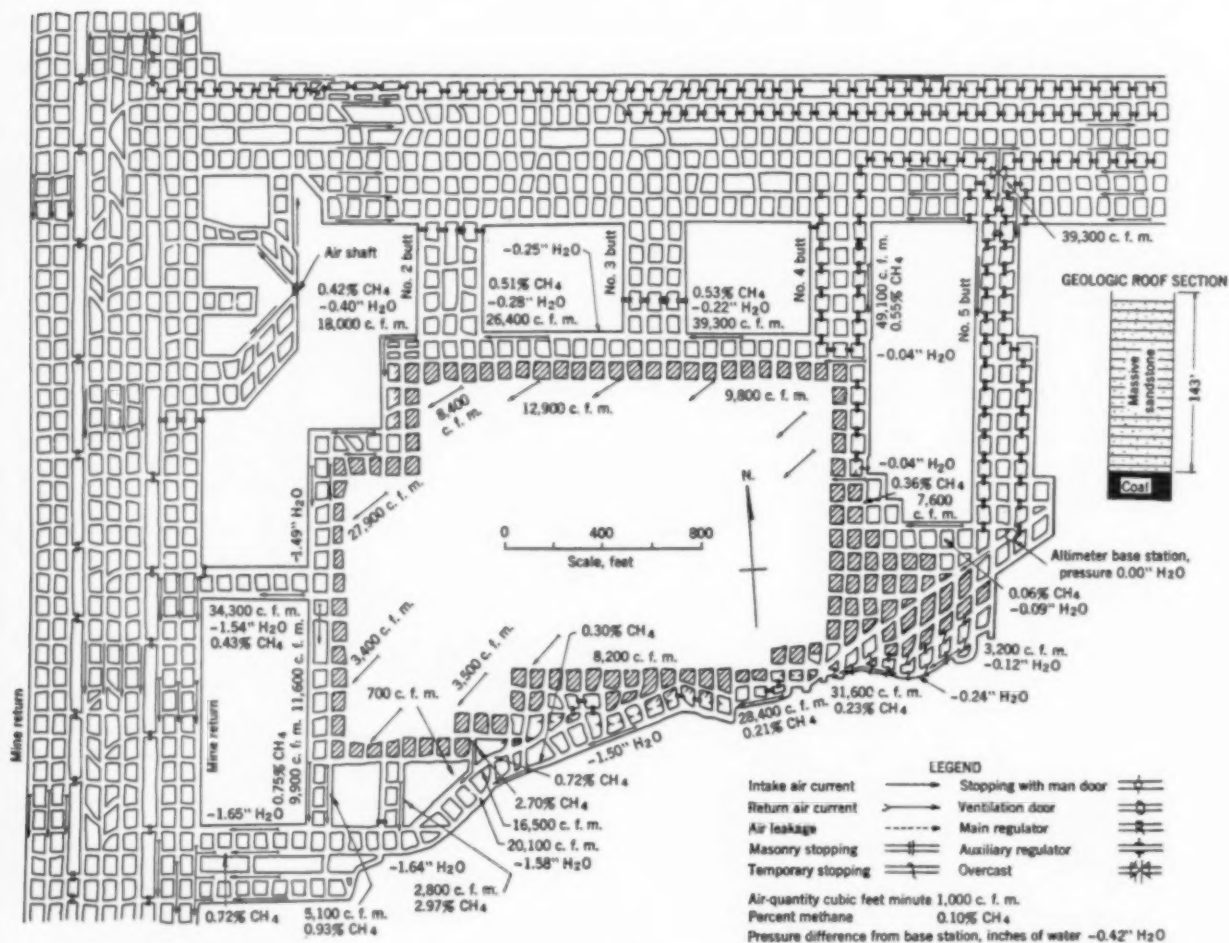


FIG. 4

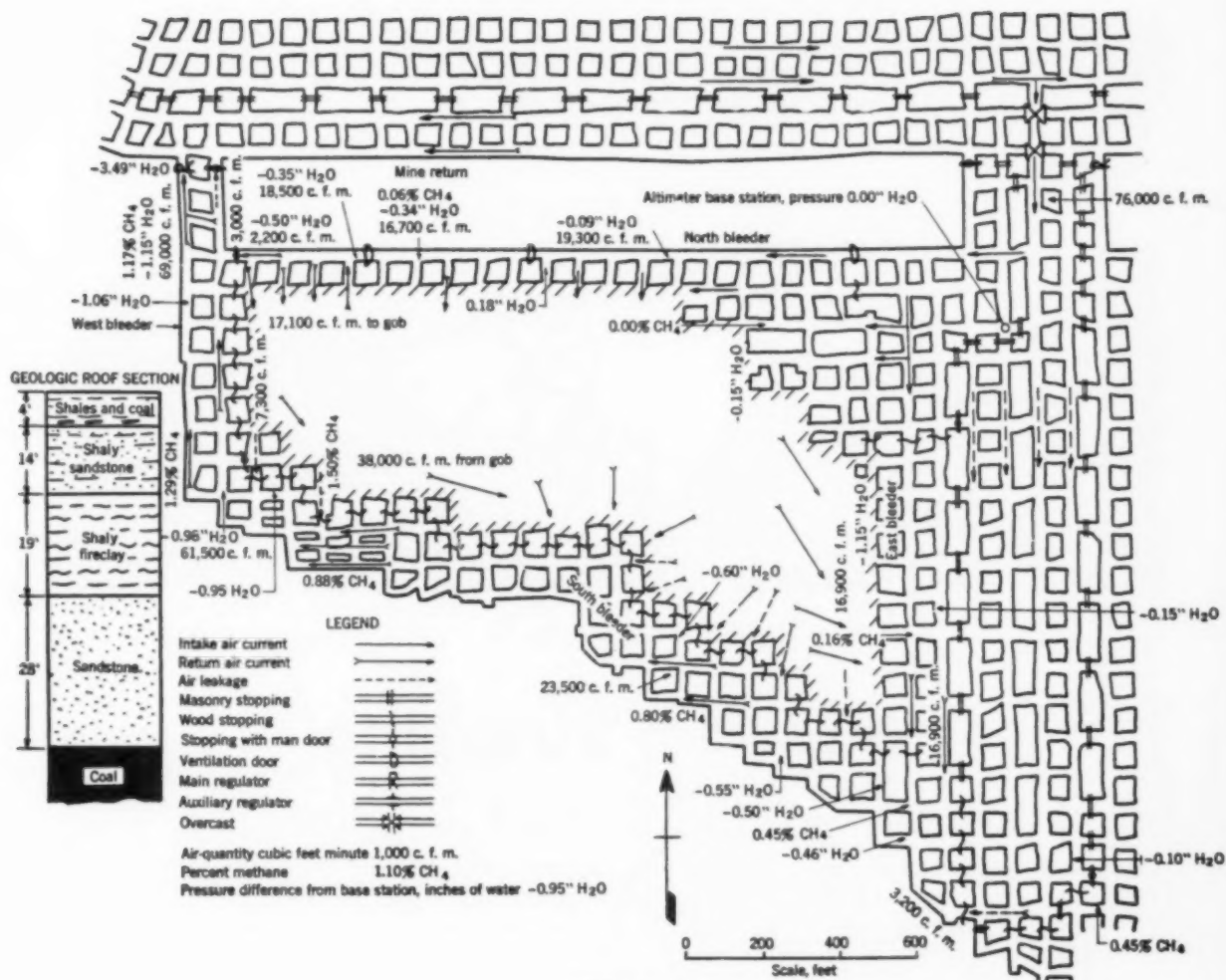


FIG. 5

## SUMMARY AND CONCLUSIONS

These data obtained from our studies cover test areas ranging by nature from gassy to ultra gassy and pillared areas varying in size and degree of tightness. The method of ventilation control, application of the bleeders, as well as the method of supporting bleeders varied between individual tests.

The following conclusions are based upon the test data and from observations made during the study. They may be considered representative of similar conditions and operations.

1. In each bleeder system study, some air movement was traced through the pillared area, ranging from 29 to 82% of the air delivered to the pillar line.
2. The air movement through the various gobs was removing methane in quantities of from 201,600 to 1,174,000 cu ft per 24 hr directly to the mine return system and at rates of 3,100 to 107,000 cu ft per day per 100,000 sq ft of gob area.
3. The distances that air traveled through pillared areas varied with the pressure and the type of gob. However, in large, tight gobs, although the air was not reaching the high caved areas or the gob interior, the continuous flow of air around such places diminished the

hazard of a sizable methane outburst from the gob.

4. The layout of the bleeder system and the manner in which bleeder entries were supported were important to the effectiveness of the system. Obstructed bleeder entries did not permit sufficient quantities of air flow; this limited the air movement across gob areas.

5. Planned control measures were necessary for the continued effectiveness of the bleeders; as the pillar line retreated and the caved area became larger and tighter, better control and more openings to the bleeder entry were needed.

6. The characteristics of the immediate roof proved important to the effectiveness of bleeder operations. Formations that broke into large pieces or slabs provided open gob areas. Heavy unconsolidated roof usually broke into small fragments filling void spaces which made a tight gob. The type of roof also was a factor in the problem of maintaining the bleeders open.

Based upon the results of these tests as described, it is concluded that, in most applications, provided the bleeder ventilation system has been well planned and the bleeders are reasonably clear of obstructions, a bleeder system of ventilation will reduce the hazard of dangerous accumulations of mine gases being released into active working areas.



**WHEEL EXCAVATOR** extends stripping range in areas where unconsolidated material forms upper portion of bank. Wheel and big shovel will strip a maximum of 100 ft of cover and have a combined capacity of 4,000 cu yd per hour.

## Midwest Stripping

**Here's a look at today's machines and methods and a glimpse of what they will be in the future.**

By **W. A. WEIMER**  
Chief Engineer, Peabody Coal Co.  
St. Louis, Mo.

**EXCAVATING THE OVERBURDEN** from coal at greater depths and different stratas is subject to a variety of conditions and the correct machines must be employed to fit the conditions to produce most economically.

Strip mining accounts for approximately 42% of the total coal production in Illinois today and about 25% in the United States. Strip production has been gaining percentagewise on shaft production but strippers do not feel too secure that the gain will continue. This gain is due to the fact that shaft coal production has been declining and the strip coal has been holding nearly uniform. The decreased market and economic factors in the past few years have given the advantage to the strippers. You are aware that market experts have predicted coal has a very bright future, some of which we are already beginning to see. As the coal market expands and

Adapted from a paper presented at the Illinois Mining Institute, Oct., 1956

the shaft mines introduce such new machinery as mining machines and extensible gathering belts the strippers are in for a challenge costwise. This will greatly affect the machines and methods of strip mining as the overburden becomes deeper and the stratas harder. Shaft mining and strip mining are not particularly in a race with each other but both are attempting to mine the future expected volume of coal as economically as possible.

The past 30 yr has been the age of large stripping shovels and some of us have seen the bucket capacities grow from 8 cu yd in 1925 to 70 cu yd today. That is roughly an 800% increase. Yardage-handling capacities have increased in the same relative proportions as also has the weight of the machines. The new Marion 5760 and the Bucyrus 1650 shovels weigh about 2,500 tons. These new shovels are so large and high that an elevator is required to get the operating crew on them and the replaceable parts so heavy that they can no longer be handled by the men of the operating crews. The bolts and nuts now require two men to lift them and we have to use a tractor to turn over a rope socket

on the large draglines and a 16-lb sledge will scarcely set the wedge socket on the drag rope. It appears that our newer shovels are rapidly approaching their maximum weight.

If we compare the ranges of the large shovel of 1927 with the largest shovel today we see a much different picture. The 1927 shovel could strip cover to a depth of 48 ft and the present machine will strip a 72-ft maximum cover. That is a 50% range increase in 30 yr compared to an 800% increase in capacity. The capacity increase was a natural occurrence due to better design, higher strength of metals, better bank preparation by blasting and good overall engineering. The increased capacity is still not enough since the low ratio coal, that is, under shallow cover, is being exhausted and fewer stripping fields are being discovered every year. Two men working in a trench with hand shovels will double the work of one man but the two will not dig any deeper. We all try to get as much work out of the first man as he can do before we hire the second man. If we have to dig deep we then hire a long tall fellow. Along with increased yardage must go a greater range of digging depth and stacking reach. When we have a choice of equipment for a new mine, we should take advantage of the different types that have been invented



**WALKING DRAGLINE** is the choice where very thick overburden is to be removed. Unit can move crosswise to direction of pit and increase spoil cross section or work in tandem with another machine.

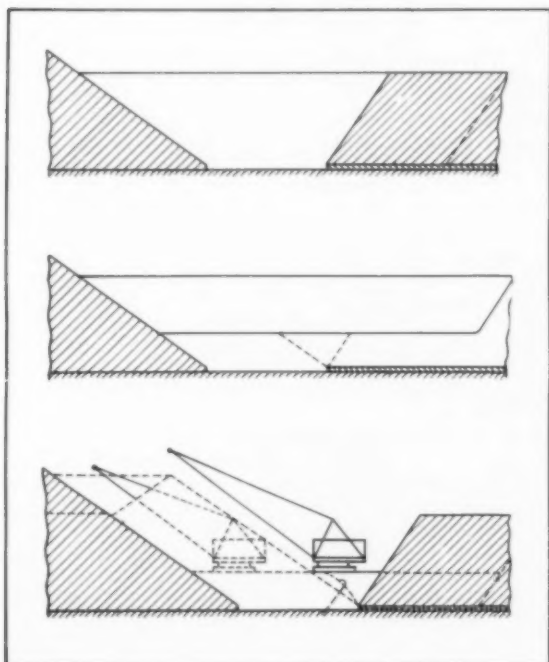
and developed at various times during the past 15 yr.

In the past when the stripper dug into a hill or low spot in the coal and the pit began to narrow critically he put a small dragline on the spoil and pulled the spoil back enabling the

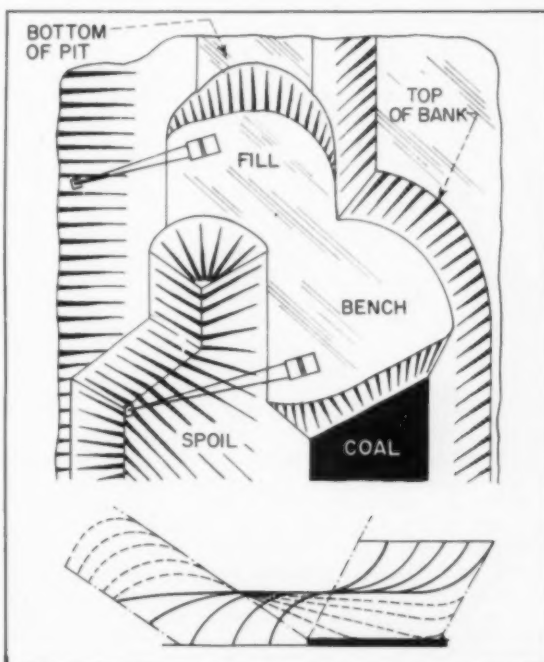
pit to continue but the dragline handled the same spoil that the main stripper had already cast. Some companies have further developed this method and are now handling the spoils very efficiently by this method. But the helper was usually one-fourth

the size of the main stripper and one-fourth of a 70 cu yd bucket is 18 cu yd, quite a sizable machine to double handle spoil.

In 1927 the Northern Illinois Coal Corp. introduced the tandem method of stripping whereby a 12 yd shovel



**CROSS SECTIONS** show typical stripping sequence. Bench operation with filling of "V" is shown in center.



**TANDEM PLAN** includes one dragline with short boom, very large bucket; second has longer boom, smaller bucket.



**BIG SHOVEL** is the favorite stripping machine in hard strata less than 60 ft deep. A new high in capacity will be reached with delivery of 70-yd unit.

was followed by a 10 yd dragline, both working on the coal, with the shovel digging the lower harder strata and the dragline the upper one-third of the bank. This combination could and did strip to 72 feet for a three foot seam of coal. This combination worked successfully for 25 years when the machines became obsolete because of small yardage capacity as compared to the later machines.

Necessity proved to be the mother of invention at Wilmington as both the wheel excavator and the walking dragline method was conceived and patented there. The wheel excavator substitutes the dragline in the tandem method of stripping and greatly increases the volume of the removal of the upper overburden. This adapts it for use with a higher capacity shovel and balances the combination for greater efficiency. The walking dragline method employs one or more machines to work on a bench and fill the "V" between the spoil and the highwall permitting the dragline to walk at right angles to the direction of the cut and increase the spoil room by spoiling higher and farther. Pits more than 150 ft deep and 80 ft wide can be worked by this method. A company in Texas is now stripping 160 ft deep by using this method. Several methods of working two walkers together and even a large shovel on the bench in combination with the dragline have been successful.

The wheel excavator was developed

by the United Electric Coal Cos., Canton, Ill., and is very successful in combination with a large shovel. This is again similar to the two men working in a trench but with one man twice as tall as the other, consequently doubling the yardage. This combination will strip a maximum cover of 100 ft and have a combined capacity of 4,000 cu yd per hour. The wheel has a possibility of being increased to 3,500 cu yd per hour which would boost the total combination to more than 5,000 cu yd per hour, which would certainly make a yardage cost of less than 3c per yard.

It appears that the wheel has tremendous possibilities of increasing yardage capacities in the type of overburden that it can handle in combination with a shovel due primarily to the fact that the wheel is a continuous excavator not using valuable time to swing from the highwall to the spoil bank. In overburden having unconsolidated material or softer shales in the upper portion of the bank the wheel will outperform any of the swinging-type excavators. The walking dragline, having its greater range due to the fact that it can move crosswise to the direction of the pit and increase the spoil cross section, will have the deep stripping advantage and would be the choice when very deep overburden is to be removed.

With the development of better overburden blasting we are rapidly approaching a bank condition where

hard stratified materials can be broken up for the stripper. Better bank preparation calls for a machine that can dip or bail out the overburden and this method and dragline is about the best bailer-outer known. Coupled with its greater range it will no doubt mine the deepest of any of the stripping combinations in the foreseeable future. The shovel will no doubt be the prime mover for many years to come, even though it has to have a spoil helper on the bank to assist it over the deep places. Many machine manipulations such as double cutting of the high wall have been used for years and pit design to introduce outside spoil curves will increase the shovel's range to some extent. Opening wide in contour stripping and losing width will also help but increasing the shovel's overburden range capacity by these manipulations when employed continuously are a disappointing method to dig deep overburden.

In summarizing it appears best to use a shovel in hard strata less than 60 ft deep, a shovel and wheel in overburden from 50 to 90 ft, and the walking-dragline method when the cover is from 80 to 150 ft in depth. We have also come to the conclusion that the stripping industry needs a machine that has the digging qualities of the shovel, the range of the dragline and the continuous performance of the wheel. I know that there are people working on such a machine but until it is built we will have to choose the excavator that will suit our local conditions.

My company, the Peabody Coal Company, has recently purchased four 60- and 70-cu yd shovels. Two of these machines will begin working in old strip pits to remove that extra 25 to 30 ft depth of cover that was not possible with the older machines. The first machine, a 70-yd Marion 5760 shovel is to be delivered beginning in December and will work in the old United Electric Coal Cos. Red Ray property near Freeburg, Ill., where it will work in overburden ranging from 50 to 90 ft deep uncovering a coal seam 7 ft thick. This will be known as the River King strip mine and coal will be hauled 3 mi northeast to a new tippie that will also serve a slope mine. Work has been progressing for the past year in the building of this washer, a railroad from Belleville to the mine and a river loading dock in East St. Louis.

The second shovel also a 5760 Marion to enter old strippings will be delivered next summer into the old Sunlight Coal Co. pits near Boonville, Ind., where it will mine the Millersburg seam and also have a bank of 30 to 90 ft in depth.

# Coal Age

## Year End Meetings—1956



**ON THE SPOT**, staff-written reports  
of six industry meetings tell you what  
coal's leaders are doing.

To reduce fatalities and extend training, coal's  
analysts push for a stepped-up program at . . .

◀ **The 44th National Safety Congress . . . . . p 80**



Rope belts, continuous mining, roof support and  
mine development are highlights at the . . .

◀ **Appalachian Section, AIME—W. Va.  
Institute Meet . . . . . p 82**



Preparation, stripping, transport and safety head-  
line the 64th annual meeting of the . . .

◀ **Illinois Mining Institute . . . . . p 84**



The first conference in a decade stresses the  
need for new uses and expanded research as . . .

◀ **Anthracite Revives Conference . . . . . p 86**



Coal's future, the need for trained men, and  
continuous mining are top themes at the . . .

◀ **17th Annual Kentucky Institute Meet . . p 88**

**Southern Producers Review Industry Outlook . . . . . p 90**



**MONDAY AFTERNOON**—S. P. Polack (left), USBM; R. R. Williams Jr., The Colorado Fuel & Iron Corp.; F. J. Foresman, The Pittsburg & Midway Coal Mining Co., presiding chairman for the session; James Leeber, Jr., UMWA.

## 44th National Safety Congress

Industry analysts push for a stepped-up safety program which will:

- Reduce roof fall fatalities.
- Aid mine ventilation.
- Extend 100% training.
- Develop flame-resistant hydraulic fluids.
- Personalize safety.
- Improve underground fire-fighting methods.

**CONCENTRATION** on what coal must do in personnel training and mine engineering to eliminate the stumbling blocks standing in the way of a better safety

record keynoted sessions of the National Safety Council's Coal Mining Sec. held Oct. 22-24 in Chicago, Ill., at the NSC's 44th annual congress.

Jam-packed into one of the Conrad Hilton's private conference rooms, representatives from federal and state safety agencies, the UMWA, producing companies and equipment manufacturers heard session speakers stress the benefits of personalizing company safety programs, the vital role of 100% accident-prevention training, and the actions necessary to reduce roof fall fatalities. Discussions also featured talks on the preliminary results of a USBM survey on flame-resistant hydraulic fluids, roof bolting with continuous miners, the effectiveness of bleeder entries in ventilating pillared areas, core drilling as an aid to mine ventilation, and underground fire-fighting equipment.

New section officers for 1957 were elected as follows:

General chairman—Charles Ferguson, safety director, UMWA.

First vice chairman—George Sambrook, director of mine inspection, Coal Div., U. S. Steel Corp.

Second vice chairman—L. H. Johnson, safety engineer, Peabody Coal Co.

Secretary and newsletter editor—Harry Weaver, chief, coal mine inspection branch, USBM.

Gil G. Grieve continues as staff repre-



**TUESDAY AFTERNOON**—George Stachura (left), Old Ben Coal Corp.; James D. Reilly, Hanna Coal Co.; Andrew Rayner, UMWA. Also speaking at the session, but not included above, were J. A. Boyle, U. S. Steel Corp.; and F. J. Foresman, The Pittsburg & Midway Coal Mining Co., chairman.

## Year End Meetings—1956



WEDNESDAY AFTERNOON—C. W. Parisi (left), Pittsburgh Coal Co.; Arthur Bradbury, Inland Steel Co.; D. S. Kingery, USBM; Charles Ferguson, UMWA, session chairman.

sentative of the National Safety Council to the Coal Mining Sec.

F. J. Foresman, director, industrial relations, The Pittsburgh and Midway Coal Mining Co., retiring chairman of the NSC coal mining section, presided over the Monday and Tuesday sessions at which the following presented papers:

James Leeber Jr., safety engineer, District 29, UMWA; R. R. Williams Jr., manager of mines, The Colorado Fuel & Iron Corp.; S. P. Polack, health and safety engineer, USBM; George Stachura, superintendent, Old Ben Coal Corp.; James D. Reilly, vice president, Hanna Coal Co.; J. A. Boyle, chief mine inspector, Frick District, U. S. Steel Corp.; and Andrew Rayner, safety director, District 4, UMWA.

Newly-installed chairman, Charles Ferguson, presided over the Wednesday session at which the following gave papers:

D. S. Kingery, assistant chief, Mine Ventilation Sec., Bureau of Health Research, Div. of Health, USBM, Pittsburgh, Pa.; Arthur Bradbury, assistant manager of mines, Inland Steel Co., for D. A. Zeeger, assistant to president, Consolidation Coal Co. (Ky.); and C. W. Parisi, director of safety, Pittsburgh Coal Co.

### Safety and the UMWA

In the lead-off paper of the first session, Monday afternoon, James Leeber Jr., UMWA, described the considerable success that District 29 has achieved with safety programs established by the UMWA, USBM, the West Virginia State Department of Mines and top management of producing companies. But he noted that there was still much room for improvement in the frequency rate for fatal and non-fatal injuries caused by roof falls. Toward attacking this problem, the above-mentioned groups agreed early in 1956 on a 13-point

### INDUSTRY MEETING— A Special Coal Age Staff-Written Report

program of action aimed at closer cooperation between all safety agencies, management and employees, and stricter compliance with existing safety codes, regulations and practices.

Mr. Leeber said that the District 29 Safety Department has also launched another program which requires the creation of joint safety committees on the local mine level. These committees consist of 8 members, 4 representing local management and 4 representing the local union. The duty of this committee is to work on a cooperative basis to advocate full and strict compliance of the company's safety regulations, the Federal Mine Safety Code and Act, the state mine laws, and safety regulations adopted by the committee to combat any existing hazard at the mine.

In discussion, Mr. Leeber said that the 13-point safety program conducted in District 29 was adaptable to all other districts. He also brought out the fact that in approaching a producing company he always went to the top management official who, in every case, had given him 100% cooperation.

### Personalizing Safety

In the next paper, R. R. Williams Jr., The Colorado Fuel and Iron Corp., spoke on that company's experience in changing to a more personal safety program.

"Most of us felt that our safety program was sufficient, that the rules and regulations were adequate, and that our accidents were due mainly to overconfidence and lack of judgment on the part of the injured individual or his fellow workmen. Analyses of our accidents

showed that they were largely all avoidable, usually due to failure on the part of the injured workmen to think and work safely at the time of the acts that brought on the injuries. But those conclusions didn't solve the problem facing us.

"What could we do to further encourage our safety program? We knew there was a missing link somewhere. Why not write a personal letter to each employee and mail it to his home? We came up with this thought nearly a year ago, so why not start out by sending a Christmas letter to each employee? This we did after checking up carefully on the home addresses of the employees. The letter we sent out was of full-page size and was signed by me and the general superintendent of coal mines, and was written on stationery appropriate for the holiday season. In the letter we explained that the holiday season, according to our past records, was the worst period of the year from an accident standpoint, and urged personal safety in the mines, as well as elsewhere during the busy period ahead. Some accident statistics were quoted, expressed in a plain and simple manner, and the letter was closed with best wishes to the employee and his family for a joyous Christmas season and a safe and Happy New Year.

"Responses from this letter were numerous and extremely gratifying, and the accidents during the holiday season were practically nil, whereas in previous years, we were lucky to get off with anything short of a fatality during each holiday season.

"We felt that these personal letters should not be too frequent and commonplace, so we delayed writing the next letter until in May, a month or so before the beginning of the 12-day miners' vacation period. This again was a full-page letter, expressing in part the appreciation of management for the cooperation that made the Christmas season, as well as subsequent months, a record period for safety. Some safety statistics were quoted to prove this point, and the letter was closed with best wishes for a very enjoyable and safe vacation period, and signed by me and the coal mines general superintendent.

"As in the case of the first letter, the response was extremely gratifying, and we are happy to state that while this is merely another step in our accident-prevention program, we feel that this personal contact has been well worthwhile, which can be attested to by the following statistics for 7 mo of this year, compared with the same period of last year:

	7 Mo 1955	7 Mo 1956
Frequency ..	12.86	10.04
Severity .....	.334	.256

This frequency and severity comparison covers three mines; namely, Allen, Frederick, and Morley until May 4, 1956, when Morley was closed down due to depletion of coal reserves available to that property."

"We realize that once we start taking



**ROPE BELTS, YIELDING ROOF JACKS, PORTAL BUSES**—H. E. Mauck (left), chairman, program committee, Olga Coal Co.; Lou Ahlen, Goodman Mfg. Co.; Alex Grant, Youngstown Sheet and Tube Co.; J. W. Pero, Pocahontas Fuel Co.; and C. O. Carman, Eastern Gas & Fuel Associates.

**Rope belts, continuous mining, roof support and mine development highlights at . . .**

## Appalachian Section, AIME—

**NEW BELT DESIGNS**, better personnel transportation, continuous mining, a low-cost manshaft and development of the Ireland mine were main topics at the annual joint meeting of the Central Appalachian Section, AIME, and West Virginia Coal Mining Institute, held Nov. 2 and 3 at White Sulphur Springs, W. Va. Also featured on the program were papers on aerial photography as applied to coal mining; the new Kammer power plant and the new aluminum plant of

the Olin Revere Metals Corp., both of which are located adjacent to the Ireland mine.

In business sessions, the two organizations elected officers and directors as follows:

President, West Virginia Coal Mining Institute: C. R. Nailler, Christopher Coal Co., succeeding C. E. Hough, deceased.

Vice Presidents: George McCaa, Hanna Coal Co.; R. Glenn Lazzell, Island Creek Coal Co.; S. Dunlap Brady, Baltimore &

Ohio R. R.; Harry G. Kennedy, Kanawha Coal Operators' Assn.; and H. E. Mauck, Olga Coal Co.

Executive Board: C. R. Bourland, The New River Co.; James F. Trotter, Trotter Coal Co.; Arch J. Alexander; Harry Quenon, Eastern Gas & Fuel Associates; and R. C. Luther, Peerless Coal & Coke Co.

Secretary-Treasurer: G. R. Spindler, head, School of Mines, West Virginia University.

Chairman, Central Appalachian Section: F. M. Morris, Clinchfield Coal Corp., succeeding R. M. Allen, French Coal Co.

Vice Chairmen: H. O. Zimmerman, Inland Steel Co.; W. A. Griffith, New Jersey Zinc Co., and H. Robinson.

Executive Committee: F. R. Toothman, C&O R. R.; W. J. Skewes, Pocahontas Fuel Co.; and D. A. Zegeer, Consolidation Coal Co. (Ky.).

Secretary-Treasurer: Charles T. Holland, head, Department of Mining Engineering, Virginia Polytechnic Institute.

Presiding officers at the sessions were: Alex Grant, Youngstown Sheet & Tube Co.; Jesse Redyard; Woods Talman, U. S. Steel Corp. and H. E. Mauck, Olga Coal Co. E. G. Fox, president, Bituminous Coal Operators' Assn., spoke at the Friday luncheon, at which C. R. Nailler, president, West Virginia Coal Mining Institute, presided.

Speakers and their topics at the Friday morning session were Lou Ahlen, district manager, Goodman Mfg. Co., Terre Haute, Ind., on rope belt conveyors;



**IRELAND MINE, POWER, ALUMINUM**—D. W. Parsons, American Gas & Electric Service Corp.; W. G. Talman, U. S. Steel; Ralph Stohl, Olin Mathieson; and L. G. Sarff, Hanna Coal Co.



**CONTINUOUS MINING, BORED-HOLE SHAFT, AERIAL MAPPING**—James Trotter, Trotter Coal Co.; Jesse Redyard; C. R. Nailler, president, West Virginia Coal Mining Institute, Christopher Coal Co.; C. J. Kirby, Eastern Gas & Fuel Associates; and L. H. Relland, Pocahontas Land Corp.

## W. Va. Institute Meet

C. O. Carman, superintendent, Eastern Gas & Fuel Associates, Stotesbury, W. Va., on yielding roof jacks. J. W. Pero, director of safety, Pocahontas Fuel Co., Pocahontas, Va., on portal buses for transporting personnel.

### ROPE BELTS

"The past decade has witnessed an increasing trend toward systems of underground mining which provide concentration of machinery and production from fewer working sections. This trend was greatly accelerated by the application of machines which can mine coal from the solid face."

As a result of this trend, Mr. Ahlen said that the industry recognized the economical need for a conveyor transportation system which could be installed quickly, extended at a low cost and at the same time reduce supply line traffic and maintenance cost. To meet the need, the Goodman Mfg. Co., departed from the conventional rigid type panline and proceeded to develop a belt conveyor which would be suspended on two parallel stationary wire ropes.

In describing today's design, Mr. Ahlen said the portion of the conveyor between the head and tail sections consists of two parallel wire ropes, the ends of which are individually fastened to the head and tail or to the roof or floor. Carrying idlers are spaced on 5-ft centers. Supports for the ropes also hold the return idlers and are spaced on 20-ft centers. A rope spreader is installed midway between ground supports. The

distance between wire ropes is 12 in more than the belt width. The rope may be either  $\frac{3}{4}$  or  $\frac{1}{2}$  in in diameter, depending on the type of unit required and the stress that will be put on the rope.

Following development for panel and main line duty, the rope belt was made extensible, Mr. Ahlen continued. The extensible Ropex unit consists of crawler-mounted self-propelled head and tail

sections linking a section of 36-in rope conveyor. A bridge conveyor, attached to the rear conveyor of the continuous miner, travels on wheels over the Ropex tail section.

Benefits and advantages of the rope belt cited by Mr. Ahlen are as follows:

1. Drastic reduction in installation and extension time. It takes only six man hours to make a 150-ft extension of a 36-in rope belt. It takes 30 man hours to extend a conventional belt at the same mine.

2. Flexibility of the rope belt provides impact resistance and has eliminated the need for impact rollers at loading stations. Belt edge wear is greatly reduced

(Continued on p 164)



**OFFICERS**—Central Appalachian Section: C. T. Holland, secretary-treasurer, Virginia Polytechnic Institute; F. M. Morris, president, Clinchfield Coal Corp.; R. M. Allen, retiring president, French Coal Co.; and N. F. Mefford, chairman, petroleum sub-section. Also G. R. Spindler, secretary-treasurer, West Virginia Coal Mining Institute.



**STRIPPING, SAFETY, BELTS**—W. Fletcher (left), J. H. Fletcher Co., chairman; R. U. Jackson, Hewitt-Robbins; J. Stevenson, Jeffrey Mfg. Co.; L. H. Johnson, Peabody Coal Co.; F. E. Snarr, Freeman Coal Mining Corp.; Richard E. Paddock, Joy Mfg. Co.; L. S. Ahlen, Goodman Mfg. Co. W. A. Welmer, Peabody Coal Co., also participated.

## Illinois Mining Institute Holds 64th Annual Meeting

Program features talks on preparation, stripping, transport, safety topics.



**IMI OFFICERS, BANQUET SPEAKER**—George M. Wilson (left), Illinois Geological Survey, reelected secretary-treasurer; Paul Halbersleben, Sahara Coal Mining Co., newly-installed president; F. E. Snarr, Freeman Coal Mining Corp., retiring president; Edward McFaul, Carnegie Institute, banquet speaker. H. C. Livingston, Truax-Traer, newly-elected IMI vice president, was not present for the picture.

ADVANCES in stripping, safe mine practice and belt haulage, the promise of river transport, and a new technique for freezeproofing coal highlighted the one-day program of the Illinois Mining Institute's 64th annual meeting at Springfield, Ill., Oct. 26.

At a morning business meeting, the following officers and new directors were elected:

President—Paul Halbersleben, general superintendent, Sahara Coal Mining Co., Harrisburg, Ill.

Vice president—H. C. Livingston, vice president, Truax-Traer Coal Co., Chicago, Ill.

Secretary-treasurer—George M. Wilson, head, Education Extension Div., Illinois Geological Survey, Urbana, Ill. (re-elected).

Directors—Joseph Schonthal, B. E. Schonthal Co., Chicago, Ill.; Murrell Reak, Illinois Dept. of Mines and Minerals, Springfield, Ill., and E. Gammeter, Paul Weir Co., Chicago, Ill.

Reporting on the scholarship program, Dr. T. A. Reed, head, Dept. of Mining and Metallurgical Engineering, said that the upping of scholarship awards from \$200 to \$400 a year had been a big help in stimulating student interest. He stressed the importance of continuing work to draw the attention of high school students to the coal industry. In this respect, wider dissemination of the revised edition of the University of Illinois booklet, "Careers in Mining Engineering,"



**FREEZEPROOFING, BARGE LOADING**—Laning Dress (left), Truax-Traer Coal Co.; C. C. Bailey, Old Ben Coal Corp., presiding chairman for the session; C. W. Waterman, Jr., McNally Pittsburgh Co.

could be useful, Mr. Reed added.

Dr. George Clark, Dept. of Mining Engineering, Missouri School of Mines, sounded a warning note on the pressing need to promote interest in mining careers. At the Missouri School of Mines, he said, 160 are enrolled in petroleum engineering and only 110 in mining engineering.

Dr. Reed introduced the following winners of scholarship awards to the University of Illinois: Robert Anton Henn, sponsored by the IMI; and Gary Denean Bone, Thomas Richard Brown, and Robert Ivan Pimey, sponsored by the Sahara Coal Co. Dr. Clark introduced Richard C. Dendler as the recipient of the IMI scholarship to the Missouri School of Mines.

George Wilson advised the group that plans were going ahead to produce a film on the activities of mining engineers for showing at high schools, colleges, service clubs, etc. However, the support of other industry associations, he added, was being sought to consummate the project.

C. C. Bailey, Old Ben Coal Corp., presided over the morning session at which the following gave papers: Laning Dress, preparation engineer, Truax-Traer Coal Co.; and C. W. Waterman Jr., general sales manager, McNally Pittsburgh Mfg. Corp.

William Fletcher, J. H. Fletcher Co., acted as chairman for the afternoon session at which the following presented talks: W. A. Weimer, chief engineer, and L. H. Johnson, safety engineer, Peabody Coal Co.; Murrell Reak, Illinois Dept. of Mines and Minerals; Louis S. Ahlen, district manager, Goodman Mfg. Co.; Jack Stevenson, sales engineer, Jeffrey Mfg. Co.; R. U. Jackson, sales manager, Hewitt-Robins, Inc.; and Richard E. Paddock, Joy Mfg. Co., for William

Hanson, manager of conveyor products for the same company.

## Freezeproofing of Coal

Opening the morning session, Laning Dress, Truax-Traer Coal Co., related that company's experience in shifting from liquid calcium chloride to oil for the freezeproofing of coal in plants without heat driers.

Mr. Dress explained that Truax-Traer became dissatisfied with liquid calcium chloride sprays because in the past 2 or 3 yr where such sprays have been flowing in plants, "pipes have been eaten out and maintenance was high."

Having had a great deal of experience in applying oil to coal, the company went to the Standard Oil Co. for an oil—applicable to washed coal—that would (1) be light enough for handling in all kinds of weather, (2) provide an oily coat to the coal, (3) facilitate drainage, and (4) adhere to steel surfaces in cars.

After a couple years of experimenting and applications, a light oil was selected which has a viscosity of 80 to 100 sec (i.e., at 100 deg). The pour point of this oil is minus 35 deg. It seldom gets too cold for handling. The oil has a btu value of 18,900 which makes it most attractive as an additive material. It weighs 7.8 lb per gallon. It has only a slight odor. Delivered to points from Peoria all the way south, the oil costs about 9c per gallon.

For properties where there is a heat-drying plant, Mr. Dress said that the cheapest way to load is to oil the inside of the car. "The same oil that is applied

to the coal just works wonderfully in spraying the side of the cars." As many cars and tracks can be used as desired. Some mines have ten, some two. One man can spray the cars. It takes about 20 sec to oil the inside of a car. A 50-ton hopper car will use 6 gal of oil to coat the car. A 70-ton car uses 7.5 gal—that is just slightly more than 1c per ton to coat the inside of a railway car.

## Low Cost Barge Loading

Following Mr. Dress, C. W. Waterman Jr., McNally Pittsburgh Mfg. Co., spoke on "Low Cost Barge Loading Installations—Their Part in Coal's Increasing Market." His talk, fully illustrated, is featured in this issue of *Coal Age* on p 58.

## Stripping Machines and Methods

The first talk of the afternoon session brought a discussion of recent and future stripping machines and methods in Illinois by W. A. Weimer, Peabody Coal Co. The full text of his paper is presented on p 60 of this issue of *Coal Age*.

## Safety in Illinois

Mr. L. H. Johnson, Peabody Coal Co., reviewed recent developments in Illinois mine safety practice. In particular, he pointed to his own company's comprehensive safety program which includes training in accident prevention, fire prevention and control, mine rescue work, and weekly foreman-to-crew safety talks.

Special note was made of "a simple effective method of rock dusting faces that advance rapidly, or more than 40 ft in a day, by applying liquid rock dust to the roof ribs and floors."

Rock dust can be applied on shift up to the face of any place during any cycle of operation without impeding any part of that cycle or hindering any other necessary work in that place. The only places that cannot be coated with this liquid mixture during the cycle of operation is, of course, places where blasting or breaking of coal is in progress.

This method of rock dust application is supplemented by a hopper and spreader arrangement mounted on shuttle cars which does an excellent job of rock dusting the mine floors and roadways wherever the shuttle cars are run, without clouding the air. This device was originated and put in use by Peabody and provides adequate rock dusting up to within the legal distances from any face being worked.

Mr. Johnson also spoke of:

1. A ground detector and fault finder which has come into wider use to locate exact points of trouble on cables and intricate wiring and electrical layouts. This eliminates the old trial and error methods with its worker injuries, further damage to cables and equipment, and the creation of serious fire hazards. The ground detector and fault finder is of the ohm resistor recorder type.

(Continued on p 158)

## INDUSTRY MEETING— A Special COAL AGE Staff-Written Report



**DELEGATES** from hard coal producing and consuming companies, equipment manufacturers, the USBM, the UMWA, and university research units—128 strong—meet at Penn State as . . .

## Anthracite Revives Conference

**First conference in a decade stresses industry's needs for new uses and expanded research; better mining methods, equipment and merchandising.**

A MORE STABLE MARKET for anthracite—possibly expanding in the years ahead through the development of new uses and improved mining methods and through increased sales of modern burning equipment—was foreseen by the Anthracite Conference held at the Pennsylvania State University, University Park, Pa., Oct. 18-19, 1956.

The anthracite group—called together for the first time since similar meetings at Lehigh University about 10 yr ago—was welcomed, on behalf of the Penn State University, by Dr. Eric Walker, newly-installed president, and by E. F. Osborne, dean, College of Mineral Industries. The Hon. Joseph T. Kennedy, Secretary, Pennsylvania Dept. of Mines and Mineral Industries, extended welcoming remarks for the board sponsoring the conference.

With Arno C. Fieldner, fuels technologist, presiding, at the first session, Thursday afternoon, the following subjects were discussed:

"A Process for Producing an Activated Carbon from Anthracite," by John W. Hassler, West Virginia Pulp and Paper Co.

"Effect of Thermal Treatment on the Mineral Constituents and Crystallographic Structure of Anthracite," by M. G. Boobar, C. C. Wright and C. R. Kinney, the Pennsylvania State University.

"The Suitability of Anthracite for Blast Furnace and Cupola Operation," J. W. Eckerd, R. C. Buehl, and R. F. Tenney, USBM (*Coal Age*, May, 1956, p. 60).

"Studies on Flow of Air Through Anthracite," K. M. Barclay, C. C. Wright and P. L. Walker, Jr., the Pennsylvania State University.

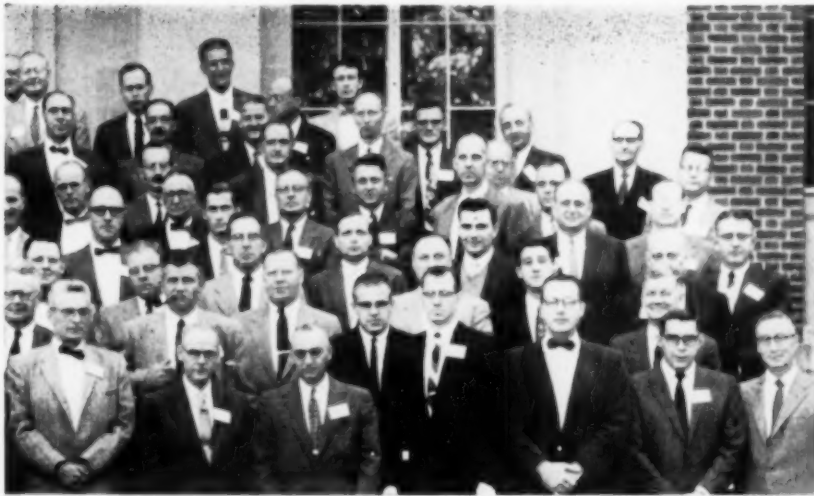
### Promise for Anthracite

The conference keynote was sounded at the Friday morning session by the presiding chairman, Edward G. Fox,

president, Bituminous Coal Operators Assn. and former president, Reading Anthracite Co. Mr. Fox said that anthracite had reached the bottom of its drop and had a promising future because (1) management was taking a new look at operations to improve efficiency, and (2) increasing support from state and federal governments, from independent



**THURSDAY AFTERNOON**—M. G. Boobar (1st row left), Penn State; John W. Hassler, West Virginia Pulp and Paper Co.; Arno C. Fieldner, Wash. D. C., chairman; C. R. Kinney (2nd row left), K. M. Barclay, P. L. Walker, Penn State; J. W. Eckerd, USBM.



research groups and from the UMWA was opening tremendous opportunities for the use of anthracite as an industrial fuel.

#### Coal and Ash Handling Equipment

Presenting the first paper of the Friday session, Harold S. Wentz, Electric Furnace-Man, Inc., discussed "Recent Developments in Pneumatic Coal and Ash Handling Equipment."

In particular, he described a pneumatic conveyor system developed by EFM for use with the Fire-Jet burner. The conveyor, which can deliver 40 lb coal per min up to 75 ft distance, is a suction type for dust-free operation. It

#### INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

uses a 4-in mercury vacuum, 300 cfm multi-stage, centrifugal exhauster. Coal and ash conveyor operation for each burner is controlled automatically by coal hopper level switches. For semi-automatic operation, the electrical control equipment is not used, as the air valve is hand-operated; the exhauster and pickups are started manually by a timer.

Commenting on Mr. Wentz' paper, Ernie Finn, Anthracite Information Bureau, together with John Hassett and Douglas Breed, retail coal dealers,

Elmira, N. Y., cited Electric Furnace-Man for their pioneer work in developing automatic anthracite-burning equipment. Mr. Hassett and Mr. Breed also noted the considerable success achieved in selling automatic anthracite equipment to schools in Elmira, N. Y. They added that 32 school boards from across the state had visited Elmira to benefit from that town's anthracite-burning experience.

#### USBM Research

An expansion of the market for anthracite probably can best be accomplished by directing future research toward the creation of new uses, supplemented by the development of new or improved mining methods and equipment to increase the output per man per day. Among many possible new uses, gasification and metallurgy appear, at the moment, to offer the most promise of consuming a large enough tonnage of anthracite to rejuvenate the industry. R. E. Morgan and J. W. Eckerd, USBM, stated in a paper presented by W. Sanner, USBM, on Bureau plans for and progress in anthracite research.

Among numerous other research projects discussed, the authors stated that studies are in progress on the production of metallurgical anthracite briquets. These studies show that, in the laboratory, a briquet can be produced, which after calcination, is as resistant to impact and abrasion as furnace or foundry coke.

The work now under way on the development of a satisfactory metallurgical fuel from anthracite may well lead to an investigation of new blast-furnace design.

In the near future a Komarek-Greaves pilot-plant-size roll briquetting machine and mixer will be installed at the Schuylkill Haven station. A pilot-size shaft-type calciner will also be built there to process large enough tonnages of lump anthracite and briquets for extensive tests in commercial-size blast furnaces and cupolas.

As little published data are available on the washing characteristics of raw anthracite, systematic sampling and washability studies are being conducted on anthracites from the various fields. Both prepared coal and pillar samples from mines are being examined.

A survey has been conducted on past investigations of processes for producing synthesis and/or high btu gas. Analysis of the available data indicates that anthracite has favorable characteristics for this type of process, for example, low volatile matter, noncaking qualities, and high ash-softening temperature.

The rising demand for natural gas has prompted a more vigorous search for a supplementary or alternate source adequate to satisfy the increased demands of the immediate and distant future. High btu gas can be produced from anthracite and is an excellent substitute for natural-gas. The relatively short distance of the anthracite fields from the densely populated and high industrialized market areas along the eastern sea-

(Continued on p 160)



**FRIDAY MORNING**—R. J. Grace (left), Penn State; Harold E. Rowen, Dwight Lloyd Div., McDowell Co., Inc.; Edward G. Fox, Bituminous Coal Operators Association; (formerly, Reading Anthracite Co.); Harold S. Wentz, Electric Furnace-Man, Inc.; William Sanner, USBM.



**SAFETY ATTITUDES**—J. A. Hagy (left), Alabama Power Co.; W. B. Wright, Blue Diamond Coal Co.; James H. Phalan, Kentucky Dept. of Mines; M. J. Ankeny, USBM; E. M. Pace, Inland Steel Co., and Harold Ford, W. G. Duncan Coal Co.

## 17th Annual Kentucky Institute Meet

More than 300 coal men attend 2-day sessions at Lexington, November 8-9

THE FUTURE OF COAL and the industrial future of Kentucky, the need for technically trained men, the importance of human attitudes in controlling roof-fall accidents, dust control in continuous mining and recent developments in stripping were top themes at the annual meeting of the Kentucky Mining Institute at Lexington, Nov. 8-9.

Principal speakers at the opening session on Thursday were S. M. Cassidy, vice president, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa., on coal's future; R. A. Bailey presenting a paper on transportation of Kentucky coal by water, which was prepared by Lt. Col. Glenn R. Taylor, Corps of Engineers, U. S. Army, Louisville, Ky., and M. D.

Cooper, National Coal Assn., Dean D. V. Terrell, University of Kentucky, and John W. Stratton, Princess Elkhorn Coal Co., in a panel presentation on the need for technically trained men.

### COAL'S FUTURE

After recounting the history of coal's growth to an annual capacity of 885 million tons in 1923 and its subsequent decline, Mr. Cassidy turned to a discussion of coal's present position and future prospects. Statistical data and projections outlined by Mr. Cassidy are:

Year	No. of Miners (thou-sands)	No. of Mines (thou-sands)	Tons Per man day
1925	588	7	4 5
1935	462	6	4 5
1945	383	7	5 8
1955	210	7	10 3
1965 <sup>1</sup>	200	5	14 0
1975 <sup>1</sup>	225	3	18 0

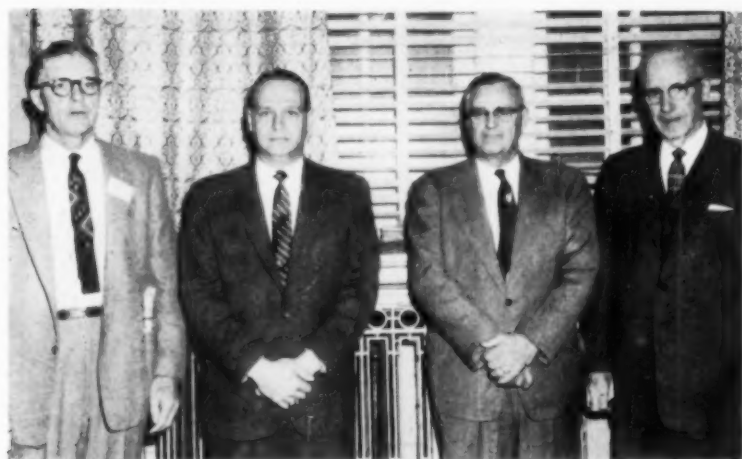
<sup>1</sup>Estimated.

Year	Electric Generation (billion kwh)	Efficiency (lb coal per kwh)
1900		7 0
1925	61	2 2
1935	95	1 44
1945	222	1 30
1955	546	0 95
1965 <sup>1</sup>	1,000	0 65
1975 <sup>1</sup>	2,000	0 60

<sup>1</sup>Estimated.



**PERSONNEL NEEDS**—M. D. Cooper (left), National Coal Association; D. V. Terrell, University of Kentucky, and John W. Stratton, Princess Elkhorn Coal Co.



**RECENT DEVELOPMENTS**—L. R. Bruckner (left), Western Kentucky Mining Institute; E. E. McBurney, Jewel Ridge Coal Corp.; O. E. May, Paradise Coal Co., and Harper Gatton, Kentucky Chamber of Commerce.

With respect to consumption of coal, Mr. Cassidy predicted a need for 225 million tons for electric-power generation in 1965 and 400 million tons in 1975. Steel in 1975 should require 150 million tons. Combined railroad and space-heating needs may drop from a 1955 consumption of 69 million tons to 25 million tons in 1975. Nevertheless, total coal needs in 1975 may be about 850 million tons. Mr. Cassidy credited his figures to a tabulation prepared and used by George H. Love, president, Pitt-Consol, in gaging past performance and future trends in the industry.

Major problems facing the industry are high cost transportation of coal and shortages of railroad cars, but the industry is actively seeking solutions, witness pipeline development, water shipments and location of power plants in coal-producing centers. New developments in high-voltage transmission may accelerate the last of these possibilities, Mr. Cassidy said.

Finally, more companies are contracting to fill long term needs of a single large customer, thus easing the investment required for both customer and supplier. And a need for consolidation is evident and the trend is definitely in that direction.

## RIVER SHIPMENTS

Noting that the Atomic Energy Commission in its search for plant sites makes proximity to coal reserves a prerequisite in selecting sites in order to effect low power costs, and that other industries (chemical and aluminum, particularly) have followed suit, Col. Taylor stated that the Ohio River Valley because of the low-cost transportation it offers is a natural choice. Coal is close at hand and stream improvements have been made or are underway to provide better navigation and ample cooling water for immense coal-fired steam-electric plants.

Indicators of the trends are as follows:

In 1955 total tonnage transported on the Ohio was 71 million tons, up 47% in 5 yr. Coal tonnage was 40 million, up 68% in 5 yr or an average annual increase for the 5 yr of 3.2 million tons. These statistics do not reflect current developments, like TVA steam plants, which have not yet been converted into increased river traffic.

Turning to other navigable rivers in Kentucky, Col. Taylor reported that shipments on the Green River are expected to reach 6 million tons annually within the next 3 yr. The Big Sandy River is under study now with a report of improvement possibilities scheduled for completion in May, 1957. A similar study is being conducted on the Kentucky River for completion in 1958. In 1955, 5.7 million tons of coal were transported on the Tennessee River, where only 200 thousand tons has been transported 5 yr before.

## NEEDED: TRAINED MEN

Dean Terrell presided at the symposium on the industry's personnel needs. As lead-off speaker, Mr. Cooper declared that the purposes of engineering training are or should be (1) development of technical competence, (2) development of a desire to keep abreast of the field and (3) development of a desire to continue to grow in professional achievement in the engineering student. Therefore, elements that should be included in the curricula should provide solid foundations in basic science, applied science and applied engineering, and appreciation of the importance of administration, cost control and personnel procedures. Finally, the liberal studies should not be neglected nor minimized.

With the need as it stands, mining companies can be of great help in providing scholarships and summer em-

ployment. Examples of different types of scholarships were described by Mr. Cooper, as follows:

1. North American Coal Corp. provides \$900 per year to each of four men, making a total of 16 in training when the program is filled.

2. Pocahontas Fuel Co. pays tuition, other college costs and a portion of living expenses at selected colleges.

3. National Coal Assn. has established scholarships in fuel technology at one school for the double purpose of training men in this important phase of the mineral industries and strengthening the undergraduate situation.

Taking up the problem of holding graduates in the industry, Mr. Cooper said that salaries must be consistent with those paid in other industries, the engineering talents of the graduate should be used (with technicians doing routine duties) and living conditions should be made as desirable as possible.

Continuing on the theme, Mr. Stratton pointed up the situation in which any company right now might have great problems in doubling its production, yet all companies may be called upon to do just that in the next 20 yr.

The facts are that current needs call for 40,000 engineering graduates a year, although only 23,000 a year are graduated. Perhaps by 1963 the rate of graduations may be up to 40,000 a year, but then the need will be greater, Mr. Stratton explained.

In addition, accountants and economic analysts will be more and more required as investment per ton of capacity increases with increased mechanization.

Right now the search for engineers is a frustrating experience. Mr. Stratton said, in describing his efforts to recruit industrial engineering talent. Up to now this quest is unfulfilled, although an experienced young mining engineer was retained in the course of events.

Still another problem with which mining men should concern themselves is that of upgrading high school education to assure that otherwise qualified high school graduates have the proper credits for admission to engineering colleges. Some considerations that should be presented to college students, Mr. Stratton said are (1) a description of the initial assignment and opportunities for advancement, (2) salary and possible increases, (3) working and living conditions, (4) opportunities to associate with other engineers and (5) opportunities to grow in professional achievement.

Cochairmen of this opening session were J. H. Graham, superintendent, Jewel Ridge Coal Co., Telford, Ky., and J. W. Basset, assistant to the vice president, West Kentucky Coal Co., Madisonville.

## ROOF-FALL ACCIDENTS

Control of roof-fall accidents with particular reference to the personal attitudes of the men involved in the industry was the theme of the Friday morning session, with M. J. Ankeny, director,

(Continued on p 168)



**EXECUTIVE COMMITTEE OF SOUTHERN COAL PRODUCERS ASSOCIATION** elected at meeting Nov. 16, 1956, at Huntington, W. Va. Seated: Frank Medaris (left), Marveyton, Ky., president, Harvey Coal Co.; W. H. Amick, Berwind, W. Va., general superintendent, New River & Pocahontas Consolidated Coal Co.; Henry F. Warden, Bluefield, W. Va., president, American Coal Co. of Allegany County; Patrick C. Graney, Mount Hope, W. Va., vice-president, Sterling Smokeless Coal Co.; and Joseph E. Moody, president, Southern Coal Producers Assn. Standing: Walter R. Thurmond (left), Charleston, W. Va., secretary, Southern Coal Producers Assn.; John J. Foster, Huntington, W. Va., vice-president, Island Creek Coal Co.; John Gall, Washington, D. C., SCPA general counsel; L. Newton Thomas, Charleston, W. Va., president, Carbon Fuel Co.; Charles R. Bourland, Mount Hope, W. Va. president, The New River Co.; and Charles Guthrie, Yancey, Ky., president, Harlan Fuel Co. Absent when picture was taken was Lawrence E. Tierney, Bluefield, W. Va., president of Eastern Coal Corp. and SCPA treasurer. Henry F. Warden was chosen as chairman of executive committee.

## Southern Producers Review Industry Outlook

**With special emphasis on transportation, government relations and safety, SCPA reviews mining and marketing today and in the future.**

A CLOSE LOOK at the present and the future from standpoints of mining, markets and safety marked proceedings at the 15th annual meeting of the Southern Coal Producers' Association, Prichard Hotel, Huntington, W. Va., Nov. 16. The association also elected directors as follows:

Harry Lavers, South-East Coal Co.  
W. W. Goldsmith, Floyd County Coal Co.  
James G. McCurry, Imperial Smokeless Coal Co.  
Charles Guthrie, Harlan Fuel Co.  
Pearl Bassham, Harlan-Wallins Coal Co.  
F. M. Medaris, Harvey Coal Co.  
John Mayhew, Blue Diamond Coal Co.  
H. C. Livingston, Truax-Traer Coal Co.  
F. R. Hornickel, Anchor Coal Co.  
L. Newton Thomas, Carbon Fuel Co.

J. J. Foster, Island Creek Coal Co.  
John Davis, Guyan Eagle Coal Co.  
J. W. Colley, Logan County Coal Operators' Assn.  
William Beury, Algoma Coal Co.  
H. F. Warden, Pocahontas Fuel Co., Inc.  
Wade Walker, Sovereign Pocahontas Coal Co.  
A. R. Matthews, Pocahontas Fuel Co., Inc.  
William Amick, Pond Creek Pocahontas Co.  
H. R. Homan, Southern Appalachian Coal Operators' Assn.  
W. T. Ray, Monterey, Tenn.  
C. A. Hamill, Sycamore Coal Co.  
Laurence E. Tierney, Eastern Coal Corp.  
L. E. Woods, Crystal Block Coal Co.  
C. R. Bourland, New River Co.  
P. C. Graney, Sterling Smokeless Coal Co.

The board in turn re-elected association officers, as follows:

**President**—Joseph E. Moody.  
**Secretary**—Walter R. Thurmond.  
**Treasurer**—Laurence E. Tierney.

Special features included a discussion of "The Election—Politics and Business," by Richard L. Wilson, chief, Washington Bureau, Cowles Publications, at the luncheon session, Mr. Warden presiding, and post-dinner entertainment by the "Patsy Teen-Agers," from David, Ky., home of the Princess Elkhorn Coal Co. mines, and the "Pioneer Five," made up of Island Creek Coal Co. miners.

Reports by Messrs. Moody and Thurmond on the coal situation and prospects were the highlights of the first business session. Topics covered were as follows:

**Production**—1956 forecast, about 500 million; Southern share, about 38%, against 35% in 1954, largely as a result of overseas exports.—Mr. Thurmond.

**Exports**—High overseas level will continue indefinitely, but forecasts for 100 million a year are not likely to be realized soon. However, the level might reach 75 million in 1960.—Mr. Thurmond.

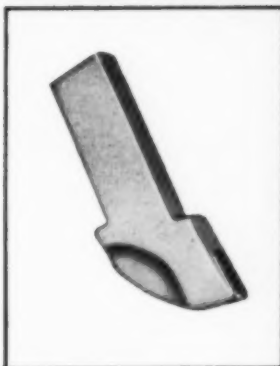
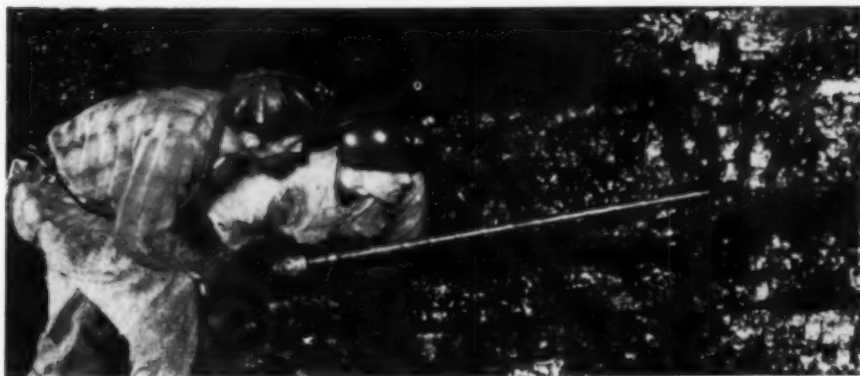
"It is my guess that some substitute

(Continued on p 172)

# CUTTING, DRILLING PROBLEMS SOLVED, PRODUCTION INCREASED 25% with Kennametal\* Cutter Bits and Drill Bits

**THE PROBLEMS:** One operator in Nicholas County, West Virginia had two problems, which together formed a serious production bottleneck: (1) *cutting*—a sulphur streak next to bottom slate

has to be cut in order to maintain proper height for equipment used; (2) drilling—impurities in the coal above this sulphur streak also present “something of a problem.”



**SOLUTION:** Kennametal U7R Cutter Bits were installed for cutting of the sulphur streak, and Kennametal DL-1 1/8" Drill Bits are used for drilling.

**RESULTS:** After one year's operation with Kennametal bits, this coal operator showed an average increase of 5 places cut and drilled per shift, to a new average of 20 places, an increase of 33 1/3%. Tonnage increase was from 475 tons to 650 tons of coal. Hole drilling time has been reduced from between one minute and one-and-a-half minutes to an average of 45 seconds each.

**COMMENTS:** Superintendent of the mine reports that the Kennametal “R” Type Cutter Bit “has proved that it will withstand shock and wear in severest cutting which we have at our mine.” He explains that the high production increase is due to:

- (1) no need to spot cutter bits in the cutter chain;
- (2) faster drilling of 6 ft. holes; and (3) fewer drill bit changes.

No matter what your cutting or drilling problems are, you will find a Kennametal Bit to do the job fast, with low bit and maintenance cost, and long bit service. Discuss your problems with a Kennametal representative. Or write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

\*Trademark

U-5555

*Ask about the Kennametal line of augers,  
pinning rods and accessories*



**INDUSTRY AND  
KENNAMETAL**  
*...Partners in Progress*

# OPERATING IDEAS



## Scrap Pipe Holds Safety Lamp

HANDY lamp racks for flame safety lamps at Westmoreland's Hampton No. 3 mine, near Clothier, W. Va., are made from short pieces of scrap 3-in pipe. A window is cut in the pipe so the cutter crew can see the flame without pulling the lamp from the rack.

Mounted at the inside of the cutter near the control levers, the lamp holder is within easy reach of the operator when he needs to test for gas. Tests are made before cutting the face and additional examinations are made as necessary.



## Belt Checking Made Easy

FAST AND EASY checking of the alignment and levelness of belt conveyors at Hampton No. 3 mine is done with a shop-made tool. Made of short pieces of scrap 1/2-in pipe and a level bubble, the tool fits over the shafts of the two inclined troughing idlers and shows whether the belt is level. B. E. Jarrell, mine foreman, shows how it is used. Belt alignment also can be checked by spotting a plumb bob, dropped from a centerline spad, to a center mark on the level. One man can use the device to check a belt in a minimum of time.



## Telephone Suspended From Roof Bolt

HERE'S a neat way to mount telephones in roof-bolted mines, reports Bill Cornette, maintenance man at Hampton No. 3. He and Richard Casto devised this type of mounting for Hampton telephones.

The phone is mounted on a piece of sheet iron to which a stiffener is welded. The upper portion of the sheet steel is slotted and bent 90 deg with the main part of the support. To permit the mounting bracket to be slid over a roof-bolt bearing plate, a slot is cut in the bracket. After the mounting bracket is slid in place over the bearing plate, the roof bolt is retightened.

**HANDLE  
WITH  
ABANDON!**

## U. S. Matchless Wire Braid Air Hose



No "babying" needed here! U. S. Rubber Engineers designed this premium quality hose with more than enough brute strength and stamina to withstand the highest working pressures, the toughest construction conditions.

And U. S. Matchless® has proved its ability to take both use and abuse indefinitely—on jobs around the world—serving long after ordinary hose has been ruined by abrasion, crushing and high pressure.

Yet in spite of its great strength, U. S. Matchless is highly flexible—practically as easy to handle as a garden hose.

Mandrel-made, wrapped-finish U. S. Matchless Wire Braid Air Hose is available in 50 ft. lengths from any of our 28 District Sales Offices, or by writing to us at Rockefeller Center, New York 20, N. Y. Whatever your hose requirements, it pays to turn to "U. S." There's a job-engineered U. S. Hose for practically every purpose—a staff of "U. S." Engineers to assist you in your hose selection.

- \* tube of high quality neoprene is completely resistant to line oil
- \* special steel wire braid gives tremendous strength, permanent bonding assured by heavy gauge rubber layer
- \* additional layer of rubber under specially coated rayon breaker protects wire against corrosion should cover be cut or damaged
- \* cover of carefully selected, tough brown natural rubber fights off injury from rocks, tools, and heavy equipment



Mechanical Goods Division

# United States Rubber



## Training Idlers Easily Mounted

HERE are two easily mounted training idlers that were developed at Hampton No. 3 mine. Either one may be mounted at any point along a belt conveyor. They come in handy if

a belt is not training properly and a crew cannot be sent to align or level the section causing the trouble. By installing these units, the belt is centered and coal spillage is prevented.



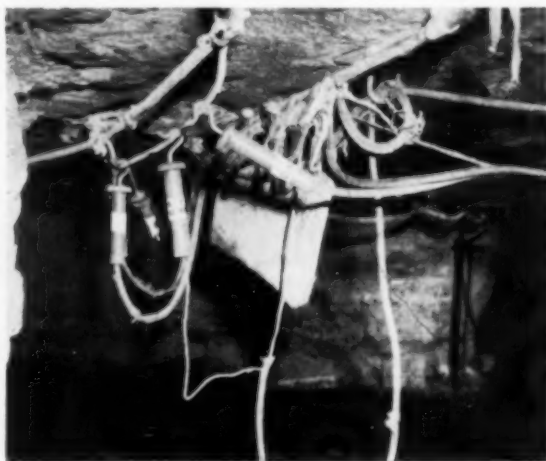
## Steel Ties Make Belt Clamp

FASTER and easier belt splices are made at Hampton No. 3 mine with special belt clamps made from 60-lb steel ties. Two ties, from which the lugs have been removed, are placed back to back and joined by 1-in bolts inserted in holes drilled near the lug positions. One of the ties has an eye welded to it at each end so a ratchet hoist can be used to pull the belt together.

When a splice is to be made, one of the clamps is attached securely to each end of the belt. Ratchet hoists are used then to draw the belt together. Management reports that a splice can be made at any point along the conveyor in a minimum of time.

## Solid Wire Nipping Station Saves Feeder

PREVENTING DAMAGE to feeder cables is achieved with short sections of solid copper wire spliced to the positive feeder at Hampton No. 3 mine. Instead of removing the insulation from a foot or more of feeder and then hooking the nips directly to the line, two short cuts are made and the solid copper wire spliced in. Nips are then hung on it. If the short solid copper wire becomes pitted and worn, it can be replaced easily.





## Does everything at C & P Coal Co.

Loads • Feeds Conveyor • Spots Cars • Stockpiles

C & P Coal Co. has had years of experience with "PAYLOADER" tractor-shovels, so when they needed another tractor-shovel, it was only natural that they chose "PAYLOADER" again. Speaking about this big new  $2\frac{1}{4}$  cu. yd. unit, their Mr. D. M. Love says, "new HO 'PAYLOADER' power-shift sure makes operation easy. It's a loading rascal with power to spare — loads out 200 tons of coal per hour within 100 foot radius of hopper. We use it for everything — loading, clean-up, spotting cars, feeding conveyor, stockpiling."

Experienced tractor-shovel users everywhere are enthusiastic about the increased production, easier operation and low maintenance of the three new 4-wheel-drive "PAYLOADER" models. 40-degree bucket tip-back and powerful pryout action, no-stop power-shift transmissions, power-transfer differentials, planetary final drives, power-steer and power-braking are some of their many features.

Your "PAYLOADER" Distributor wants you to prove to yourself that these new "PAYLOADER" models can deliver more material at less cost than any comparable tractor-shovels. See him soon about a demonstration.



Moves as many as 10 cars at a time up grade so they can drift back under tipple.

### THE FRANK G. HOUGH CO.

735 Sunnyside Ave., Libertyville, Ill.

Send data on 4-wheel-drive "PAYLOADER" tractor-shovels as checked

- ☐ model HO ( $2\frac{1}{4}$  yd. payload,  $1\frac{3}{4}$  yd. struck)
- ☐ model HH ( $1\frac{3}{4}$  yd. payload, 1-1/3 yd. struck)
- ☐ model HU (1-1/3 yd. payload, 1 yd. struck)

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_

13



**PAYLOADER®**  
 MANUFACTURED BY  
**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**  
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

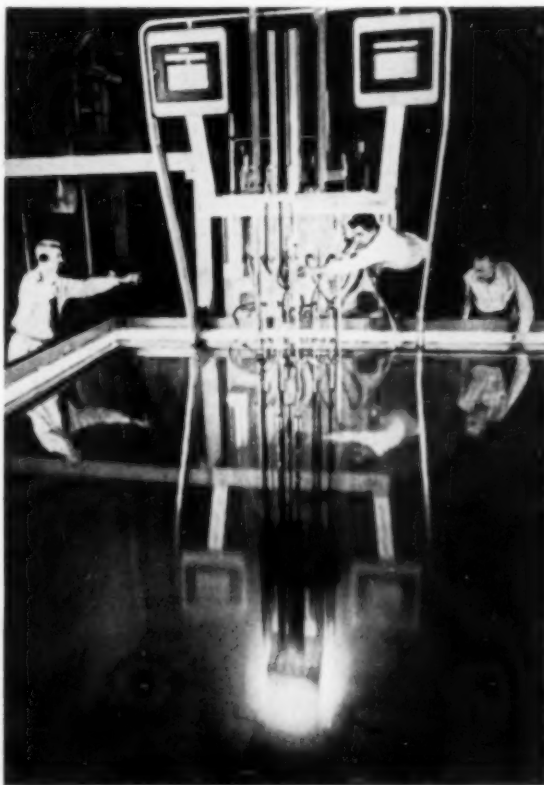


COAL AGE

# FOREMEN'S FORUM



**BIGGER, BETTER EQUIPMENT** for today's challenges in mining is symbolized by the Mountaineer, a 1956 starter.



**POWER FROM THE ATOM**, for peaceful purposes, will come in time, but coal has a big job in the decades ahead.

## Well, What Kind of Year Has It Been?

Humming activity in marketing, equipment designing, and industrial relations are highlights.

AT 11:00 P. M. EVERY NIGHT on one of our television channels here in the New York area we hear a news commentator who begins his program with these words: "Well, what kind of year has it been?" John K. M. McCaffrey, the commentator, then proceeds to give his viewers one-sentence capsules of the day's news. After this short review, he

enlarges upon the major events of the day, filling in the details and providing the background to the news.

The subject of this month's *Foremen's Forum*, which closes our series for 1956, came to mind as we listened to Mr. McCaffrey last night. Well, what kind of year has it been? What are some of the major events in coal in 1956, and how

are the industry's supervisors affected?

**Booming Export Market**—American coal flowed to friendly nations overseas in ever-increasing quantity as the months passed. Improved standards of living in these countries are supported in large part by the energy in the coal we ship. Indications are that the total export tonnage this year will amount to 48 million tons, which denotes impressive performance in mining and shipping.

The export market is important to you, whether or not coal is shipped overseas

*for the  
complete story of how the  
coal mining industry got its famous  
“strawberry grease . . .”*

*see the following pages*



**HULBURT OIL & GREASE COMPANY**

Trenton & Castor Avenues  
Philadelphia 34, Pa.



Made by thorough milling of Du Pont estersil, oil and other ingredients, Hulburt's red grease pours into drums. General Manager David Michael (left) makes sure consistency is proper.

"People who think 'grease is grease' can see the difference in this hot-plate test," Hulburt's Stuart Emmons says. At high temperature, red grease keeps shape, other melts. Red cylinders in kit are new throw-away cartridges for grease guns.

# They call it the

*...deep in the coal mines, where Hulburt's estersil*

By EMILY HEINE

Whether or not a practical joker actually substituted red grease for strawberry jam in his co-worker's sandwiches hasn't been proved, but it's a favorite story in one West Virginia coal mine. At any rate, Hulburt Oil & Grease Company's AP lubricants are known there and in other eastern coal mines as the "red" or "strawberry" greases because of their distinctive color.

They are even better known, however, for their effectiveness as lubricants. "We grease our loader with your new red grease every two to five shifts. Before, we had to grease it every shift," runs the terse approval quoted in one Hulburt trade report. A letter reads: "When we



# "Strawberry" Grease

*grease stands out both in color and performance*

adopted your 5 AP grease, we eliminated three lubricants. We were using from two to three gallons of one type per shift on the side-bar gear cases of each continuous miner. Two or three quarts of Hulburt 5 AP do the same job."

A Philadelphia concern that started as a lubricant manufacturer nearly 100 years ago, Hulburt has specialized in greases for the coal mining industry since 1918. Mechanization of many mine jobs has increased the need for lubricants. In the last 20 years, for example, bituminous coal loaded by machine underground has jumped from less than one to more than 75 per cent of production. Competing with many of the major oil companies, Hulburt built a name for quality and service, and prospered.

The company was first to market a semifluid grease that wouldn't separate in the gear case of a loading machine. But David Michael who has since succeeded his father as Hulburt's general manager, dreamed of still better lubricants. On trips through the mines he watched gigantic equipment stand idle for many precious minutes while men greased it. Even worse, several different greases had to be kept handy to meet varying requirements of water resistance and high-temperature stability.

The idea of a new multipurpose grease was in the back of Dave Michael's head one August day in 1953 when he and his father were visiting Du Pont's Petroleum Laboratory about another matter. Strolling around the conference room, Michael paused to examine a fluffy, white material. "What's this good for?" he asked.

"It's an experimental fine silica that we call an estersil," a Du Pont technical man answered. "We're testing it as a reinforcing agent for rubber and as a thickener for greases."

## WEARS A CHEMICAL RAINCOAT

More questions brought out some remarkable properties of the estersil: Particles, so tiny that it takes ten billion of them to cover the head of a pin, are joined together in spongelike structures capable of holding great quantities of oil. Because each particle wears a chemical raincoat, greases made with estersil would be water resistant. The high melting point of silica would do away with the thinning problem experienced at high temperatures with organic thickeners.

When Dave Michael left the Petroleum Lab that day it was with the promise of Du Pont help in developing a marketable grease containing the new estersil. Although only in his late twenties, Michael had years of practical experience in grease manufacture behind him. Back in Philadelphia he devoted weekends and evenings to trying out different combinations of ingredients.

Compared with a conventional grease thickened with a sodium-based soap, one estersil grease lasted three times as long. Furthermore, it functioned exceptionally well when water was present. The sodium-based grease didn't.



Estersil grease wins praise from maintenance men for job it does on coal-mining equipment like this powerful Joy loader.

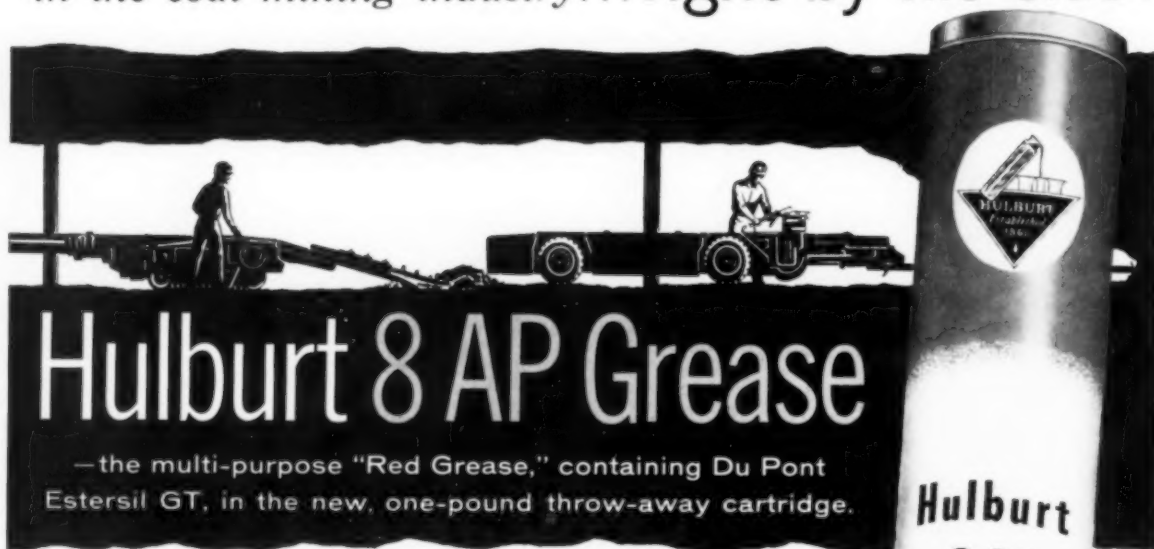
Getting the consistency of the estersil grease just right posed a difficulty, though, when Hulburt tested samples in the mines. Most greases get thinner and softer as they are used. Because of its extreme stability the estersil grease didn't, and both Hulburt and Du Pont worked on adjusting the formulation. Once properly controlled, the grease's ability to retain its consistency proved one of its big advantages. As a final, identifying touch, Hulburt added Du Pont red dye.

Since June 1954 the "strawberry" grease has been sold commercially by Hulburt's representatives in eastern coal mining areas. "Before we completed our recent expansion, we were running two shifts, six days a week to meet the demand," recalls Stuart Emmons, Hulburt's executive vice president and sales manager. Now a new milling machine, selected with the help of Du Pont specialists, is helping boost capacity 400 per cent.

Hulburt salesmen going into the mines this fall are using a new kit "to convince people that all greases aren't alike," Emmons says. Besides comparing performance of estersil grease with others at high temperatures and in boiling water, salesmen show Hulburt's new throw-away cartridges for grease guns. Quick and convenient to use, the cartridges avoid the problem of grease contamination by coal dust that filters into open drums.

With the cartridges, Hulburt also is eyeing the potentially big agricultural greasing market. "Actually, there's no end to what might be done with this estersil grease," Emmons believes. "It's good enough to carry us into many other fields."

**NOW** . . . the most famous grease  
in the coal mining industry... right by his side!



check these  
**Hulburt  
Firsts:**

**NO WASTE**—The new Hulburt cartridge completely eliminates waste associated with re-filling from a drum!

**NO DIRT**—Absolutely no dirt or other corrosive particles can mix with the sealed grease in the cartridge—before, during or after loading!

**SAVES TIME**—By keeping the easily carried Hulburt 10-pak carton at his side, he loads his gun in seconds and does not lose time returning to the drum supply!

Here, at last, is the fast, clean and thrifty way to keep your equipment in top operating condition. The new Hulburt throw-away cartridge not only saves you money by cutting handling time, waste and damage due to dirt, it also contains the best known and most widely acclaimed grease in the coal mining industry—

**Hulburt Red Grease!** This general-purpose grease has **NO MELTING POINT**; is **COMPLETELY WATER RESISTANT** and contains Du Pont's new miracle agent Estersil GT to give it practically unlimited durability.

Call your Hulburt representative today to get your greasing done the modern way.

The new Hulburt Grease Cartridges are available by the case, each containing FIVE handy

carrying cartons with 10 one-pound cartridges per carton. (Total: 50 cartridges per case.)



**Hulburt** OIL AND GREASE COMPANY  
Trenton and Castor Aves. • Philadelphia 34, Pa.

Specialists in Quality  
Lubricants in the  
Coal Mining Industry

from your mine. Shipment of such large tonnages has a profound effect upon the distribution of coal within the U. S. It may mean that companies not participating in the export trade will find new market opportunities opening up right here. The supervisor's role is to become more quality-conscious, thus making it possible for his company's salesmen to capitalize on these new market opportunities.

**Atomic Energy**—Power from the atom is No. 1 in glamor among developments in 1956. However, this year discerning experts in the field finally placed atomic power in proper perspective. Visions of cheap, abundant power from this source evaporated, and we now understand that deriving power from the atom will require a relatively long period of research. In the meantime, conventional fuels, coal, oil and gas, will be called upon to satisfy increasing demands for electrical energy. Our population is growing and our people have a greater appetite for more of the goods and services which result from a tremendous investment of kilowatt-hours. The lead article in the January, 1956, issue of *Coal Age* discusses the relationships between coal-based power and nuclear power. The study points out that in the not too distant future we will need all sources of energy to satisfy our power demands.

Right now, our standard of living in the Age of Electricity depends to a great extent upon the production of large volumes of reasonably-priced coal. This is a challenge to coal's supervisors.

**Giant Machines**—Last March the 60-yd Mountaineer shovel began around-the-clock operations in the Ohio coalfields of the Hanna Coal Co. Recent reports tell of even bigger machines now being built for early delivery to stripping operations of Peabody Coal Co. in the Midwest. These giants represent vision in their conception and skill in their execution. However, the moment these machines swing into action they become a tremendous responsibility to operations and maintenance supervisors. The cost penalties of unnecessary downtime are staggering. Elimination of downtime requires top-quality supervision. It may be assumed that other large machines for stripping will be built as the industry is forced to remove thicker cover. Highly-trained supervisors, capable of keeping these units in service, will be at a premium. In fact, such supervisors are much more important than the machines.

**New Mining Equipment**—Emphasis this year was on ways and means of improving transportation immediately in back of the face. Several types of extensible belts have been successful, and now we hear of a belt in service that actually conveys coal around one or more right-angle turns. These units permit the redesign of mining systems in order that more of the potential capacity of loading machines and continuous miners may be realized. AC power on face machinery is catching on, with several mines reporting successful AC-powered operations.

## A Mining Fable

ONCE UPON A TIME a sectional foreman, Luke McGluck, was walking along the main road, and as he turned into Miner Mike Precision's place he noticed the clearance between the cars and the timber legs was good with no stumbling hazards around. The empty cars were blocked with snubs and sprags and a drag was on the first car, the car at the loading chute was blocked to prevent unexpected movement with the headblock in place ahead of it, the carman wore goggles and gloves and had his rake handy to pull large chunks away as they fell from the chute.

As he walked by the shaker unit he noticed it was in good condition with the rocker arms and pans in alignment. As he continued up the place he found the travel-way free from obstruction and the timbers were set on standard centers, well-braced with lagging behind the legs tightened to the ribs.

When he reached the working face Mike greeted him with a smile and a cheery good morning, and he found the last timber set was within 5 ft of the face with forepoles extending 3 ft, and ahead

of this was a punch prop capped with a long capping. The rib was square with no overhangs.

Mike immediately got his testing bar, which was at the face, and thoroughly tested the roof and ribs, including the face rib. Mike then pointed out to Luke a slip starting in the roof at the face and told Luke if the cut, which he was about to drill in the coal, did not bring down the rock saddle, he would bar or shoot it down and then stand a timber set as soon as he had room.

When Luke turned to go, Mike told him to have the transportation crew place a few more empties as he was going to load some extra cars of coal, and that he was talking to the carman about doing a better job of removing refuse because he had noticed some rock in the last loaded trip before it was pulled away.

Just about this time Luke bumped his head on a low timber and was startled to see that he was still walking along the main road. Oh, well, he said, a man can dream, can't he? Some day I'm going to get me a miner like Mike Precision.

—Safety Commentator,  
The Hudson Coal Co.

Developments like these place new responsibilities on supervisors. New knowledge is needed by today's boss. New techniques must be developed by him to get the most out of this new equipment. For example, the new conveyors previously mentioned necessitate a restudy of supply procedures and the development of new methods for setting up and moving the units safely in the shortest possible time.

**Industrial Relations**—For the second time we have seen the mineworkers receive an impressive increase in daily wages without any of the fuss that heretofore attended such proceedings. It means of course that at the top levels management and labor have worked out ways of coming to agreement on knotty problems. At the local level, healthy relations between supervisors and mineworkers are of overriding importance. Such conditions can only prevail in an atmosphere of mutual respect, and where it is perfectly understood that contracts, ground rules and man-to-man agreements are made to be kept.

**A Very  
Merry Christmas  
To You and Yours**

**America's Ruhr**—The Ohio Valley continued its amazing growth and firmly established its claim as the major industrial artery of the U. S. Atomic-energy plants, new aluminum enterprises, modern coal mines, increasing river transportation of coal and freight and construction of power plants along the waterway are signs of the times. Much of the activity results from the abundance of coal that can be mined and transported to these facilities at a price that can't be matched by other sources of energy.

**Anthracite Upsurge**—This year the anthracite industry turned its curve of production upward. Increased research in utilization of anthracite in metal reduction and in gas manufacturing point to an improving future for the hard-coal industry. Aggressive merchandising of coal-fired heating systems for schools and other public buildings can be credited for the better position of the industry. Anthracite supervisors can help the cause by carefully controlling the costs of production in their areas of responsibility, in defiance of anthracite's unfavorable natural conditions.

1956 has been a year of vibrant activity in the coal industry. The health of the industry affects hosts of people here and abroad. Coal's supervisors can be proud of the 1956 contributions to that health.



Le Roi-Cleveland S-20 Stoppers on SJ74 stoper arms. These arms are air-articulated and easy to move. They conserve miners' strength, save set-up time, and provide a flexible bolting pattern.

Miner using Le Roi-Cleveland pneumatic CRD bit knock-off tool, mounted on stoper jumbo. Detacher has special shield for quicker, safer changeover.



## New Dustless-Type Stoppers, Mounted on Self-Propelled Compressor Unit, Make Roof Bolting Safer, Easier, Faster

Revolutionary dust-collection system of Le Roi-Cleveland S-20 Vac-Nu-Matic stoper ideal for mechanized roof-bolting operation.

The new S-20 Vac-Nu-Matic stoper speeds roof bolting under any set of conditions. Whether it is hand-held or mounted on a stoper jumbo, these three basic features save time, help to prevent bottlenecks: (1) high drilling speed; (2) low overall height; (3) superior dust collection.

Use it with Le Roi-Cleveland air-actuated stoper arms mounted on a compressed air stoper jumbo and it becomes a versatile, mobile roof-bolting unit—a unit that keeps pace with any mechanized operation.

**New dust collector does away with set-up time.** The stoper's revolutionary, new venturi-operated collector is Bureau of Mines approved. The dust box has a capacity of 1.25 cu. ft. and fits into the chassis of the stoper jumbo, out of the way.

Since no hood or external dust tube is needed, there are no jacks or arms to set up, no separate units to bother with. The operator's time is spent entirely on roof-bolting.

**More roof bolts installed per shift.** S-20's mounted on a stoper jumbo prevent roof-bolting bottlenecks. For example, such units have installed as many as 210 42-inch roof

bolts in a 6½ hour shift.

**Makes possible wide, flexible bolting pattern.** The Le Roi-stoper arms which attach the S-20 to the stoper jumbo are air-articulated. They reach out nine feet in front of the machine and swing in a 270° arc. They adjust for uneven top or bottom; no blocking is required. Operators can make up roof bolts while the machines are running.

Roof bolts can be installed 3 times faster with S-20 stoppers and a stoper jumbo. Write us for a demonstration in your mine, or for bulletin RD32.



**LE ROI** Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

DEEP MINING

STRIPPING

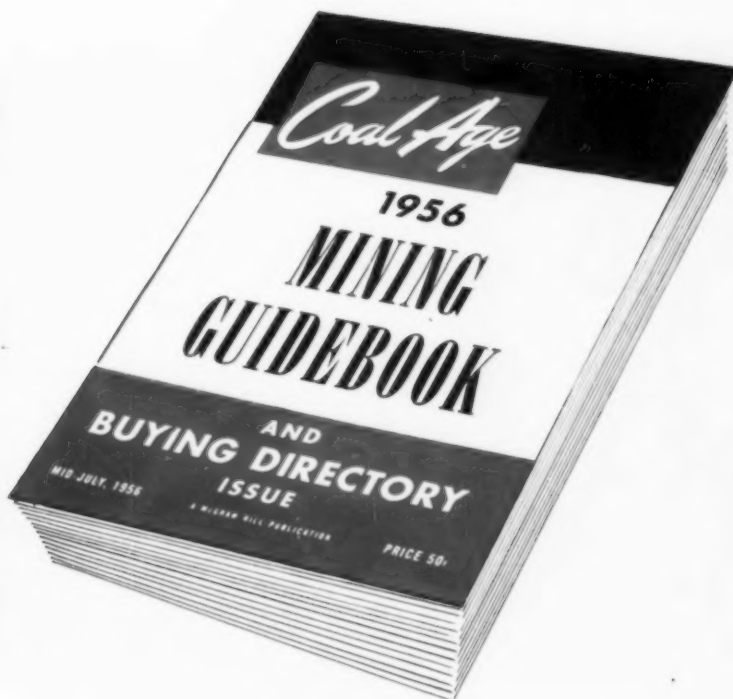
COAL PREPARATION

MAINTENANCE

SUPPLIES

SAFETY

BUYING DIRECTORY



*No Matter  
What Your Job,  
You'll Find...*

The COAL AGE Mining Guidebook  
and Buying Directory Issue  
is a useful,  
practical working manual

The largest, most complete single source of information on current mining practice available anywhere, the COAL AGE "Guidebook" will help you develop new ideas, a fresh slant on operating problems, the latest mining methods and equipment.

The 62-page Buying Directory lists for speedy reference all the known manufacturers of over 1,000 products used in coal mining, completely revised and up-dated for the 1956 edition. This comprehensive guide, along with the manufacturers' advertising and the Index to Advertisers' Sales Offices and Distributors, will help you quickly locate the nearest source of equipment, materials and services meeting your particular needs.

**KEEP YOUR 1956 GUIDEBOOK HANDY . . . USE IT REGULARLY**

# EQUIPMENT NEWS



## Cartridged Grease Keeps Out Dirt, Saves Time

Hulburt Oil & Grease Co., Philadelphia 34, Pa., now offers its 8 AP "RED GREASE" in 1-lb throwaway grease cartridges. The cartridges are designed to fit a precision-made inexpensive grease gun, which also can be used without a cartridge. Exhaustive tests by Hulburt have proved that the new cartridge eliminates waste and keeps dirt and other corrosive materials out of the grease. Thus, clean grease is applied to costly equipment. Most important of all, the company notes, is the time saved in refilling guns from drums. Time studies by independent mining engineers indicate that the savings from cartridging more than equal the cost of a cartridge filled with Hulburt 8 AP grease. The cartridges are packed in easy-to-handle carrying cartons to facilitate keeping an adequate supply near the points of application.

Hulburt has equipped its salesmen with hot-plate kits to enable them to demonstrate the qualities of 8 AP "RED GREASE." On the hot plate, "RED GREASE," containing du Pont "Estersil GT," holds its original consistency long after conventional grease has broken down. In another test, in boiling water, "RED GREASE" resists the effects of heat and boiling for over 100 hr, while conventional grease quickly begins to discolor the water.

The semifluid types of AP greases, Hulburt points out, have proved to be outstanding gear lubricants, offering the advantages of extended gear and bearing life and reduced lubricant consumption of many types of underground and aboveground machines, plus cooler operation. The result, Hulburt concludes, is a lower over-all cost per ton and less unprofitable downtime.



## Extensible Belt Conveyor

A 36-in extensible belt conveyor developed by the Goodman Mfg. Co., Halsted St., 48th Place, Chicago 9, Ill., can be

extended while operating and while linked to the discharge end of a continuous miner. As the mining machine digs the conveyor extends its carrying length to keep pace. Goodman says that previous loading and transfer delays involving a loading machine and shuttle cars, or other methods that cur-

# MINE POWER FEEDER CABLE

## TODAY'S TOP SPECIFICATION FOR MINE POWER DISTRIBUTION

NON-METALLIC ARMORED . . . shielded . . . Roebling high-voltage Mine Power Feeder Cable is perfectly adapted for practically every sort of power distribution requirement. You can suspend it vertically in shafts or boreholes; run it horizontally in underground entries or suspended from insulators. Since its outer sheath has high resistance to moisture, abrasion and other service hazards,

you can safely bury it direct in shallow trenches.

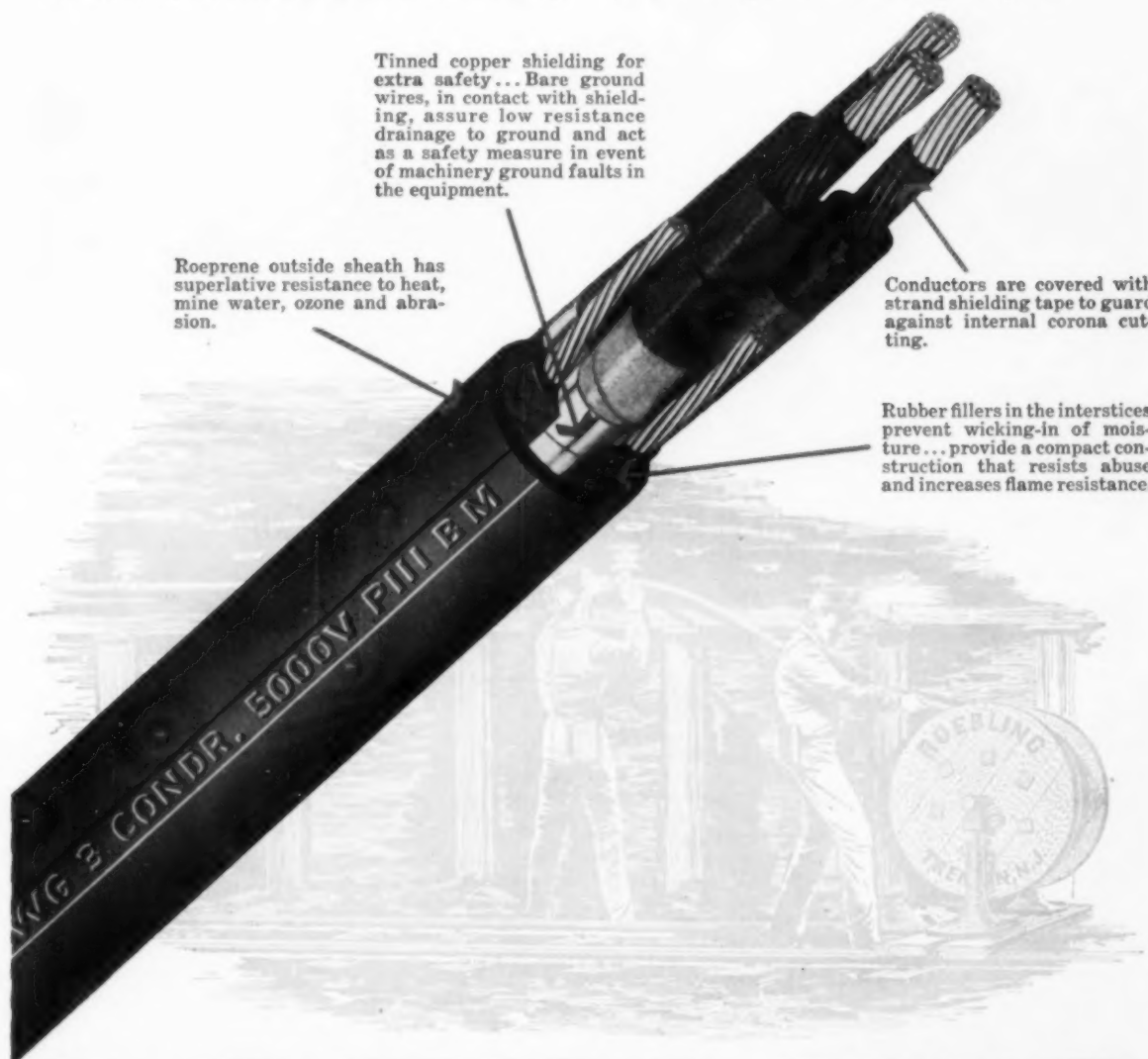
Roebling Mine Power Feeder Cable has every construction feature that assures maximum safety, dependability and service life. Classified as semi-portable, it is exceptionally easy to move and handle under all conditions. Get complete information on Roebling Mine Power Feeder Cable from your Roebling distributor or by writing us.

Tinned copper shielding for extra safety . . . Bare ground wires, in contact with shielding, assure low resistance drainage to ground and act as a safety measure in event of machinery ground faults in the equipment.

Roeprene outside sheath has superlative resistance to heat, mine water, ozone and abrasion.

Conductors are covered with strand shielding tape to guard against internal corona cutting.

Rubber fillers in the interstices prevent wicking-in of moisture . . . provide a compact construction that resists abuse and increases flame resistance.



# ROEBLING

*Subsidiary of The Colorado Fuel and Iron Corporation*

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 11-15 STILLING ST. • CHICAGO, 5825 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6316 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1733 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.



tail the capacity of a continuous miner have been eliminated. The only interruption during an advance as much as 1,000 ft, the company says, is a few minutes required to add belting to the conveyor after every 50 or 100 ft of forward progress. In mine tests, Goodman declares, the new conveyor has handled production in excess of 1,250 tons per 7 hr shift.

The tail section of the conveyor, which is connected by a bridge conveyor to the discharge end of a continuous miner is mounted on tractor treads and is motor driven. As an operator of a continuous miner drives forward beyond the reach limit of the bridge conveyor a second operator drives the tail section forward. The belt needed for this extension is reeled from an arrangement of storage spools in an open frame attached to the head section at the other end of the conveyor. This section is also tractor-mounted and motor driven, but remains stationary during the full extension of the conveyor.

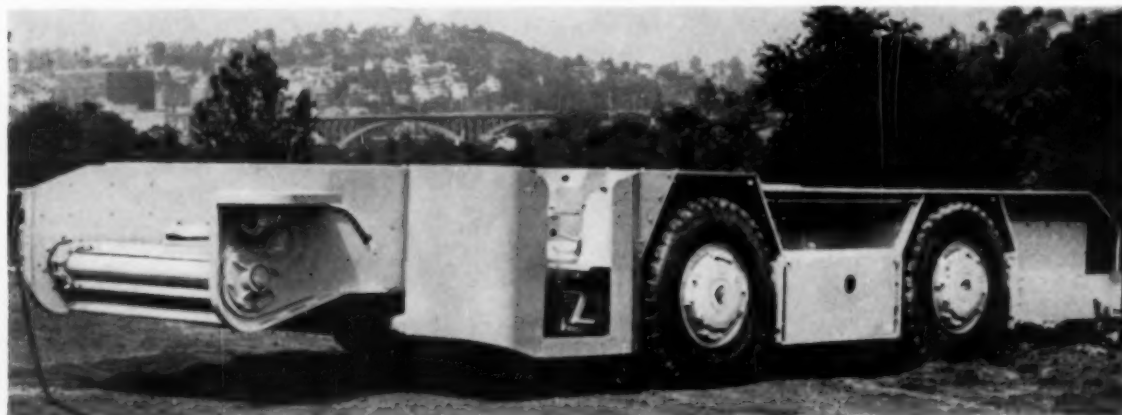
What Goodman calls a "revolutionary design" lies in the method the company has used to support the load-carrying belt. Like its rope conveyor introduced last year (*Coal Age*, October, 1955, p 92), Goodman has replaced rigid structural

framing and fixed rollers with sets of steel rollers (three) hinged end-to-end and suspended at intervals between two taut parallel wire ropes running from tail section to head section. The wire ropes are supported by stands at intervals. As the belt is extended needed rollers and support stands are added without stopping the belt. Storage drums on the tail section carry wire rope for a 1,000-ft conveyor extension.

In action the belt gives coal a soft ride because of the spring action of the hinged roller sets and of the parallel wire ropes. The action also conforms the belt to the load. Coal spillage along the line is virtually eliminated, says Goodman, which adds that the cushioned impact lengthens the life of bearings in the rollers and the life of the belt.

The entire unit's design permits the conveyor to be retracted when it may become necessary to move the continuous miner to the rear. In either extension or retraction both the belt and wire ropes pay off or reel in automatically with proper tension being maintained at all times.

Goodman says "Ropex" is available for applications in 72-in to 48-in high coal seams.



## Torque-Converter Drive Features New Shuttle Car

A new single-motor shuttle car with torque-converter drive developed by the Pittsburgh Consolidation Coal Co. will be manufactured and sold by the National Mine Service Co., Indiana, Pa., according to a joint announcement Nov. 1 by G. A. Shoemaker, executive vice president, Pitt Consol, and Gordon MacVean, president, National Mine Service. Developed by A. L. Lee and his engineering staff at Pitt Consol, the new car has been under test for over 4 yr, during which time some 50 have been built and are now in service. The National Mine Service plant at Ashland, Ky., has taken over manufacture from a Pitt Consol subsidiary.

"Exceedingly low maintenance" is a major feature cited for the new car, along with ability to use AC and other forms of power as well as DC because of the incorporation of the torque converter into the power system. The drive is from the motor or other primary power unit through the torque converter to a gear box and then by clutches, shafts and universal joints to the axles, discharge conveyor and so on. Hydraulic pumps provide power for steering, cable-reel operation, elevating-conveyor lift and energizing clutches.

Use of the torque converter in turn permits use of a motor with a low-inertia armature which runs at constant

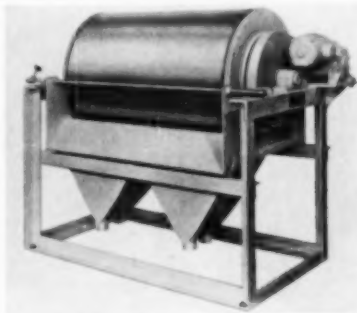
speed all the time. Maintenance advantages include a sharp reduction in electrical and mechanical surges and a better opportunity for fan cooling of the motor. Shaved gears and pressure oil lubrication of gears and bearings are among the other features leading to low maintenance. Because the motor runs at constant speed, the controls are markedly fewer and simpler.

The new shuttle car will be made available in all the usual capacities and speeds for "all unusual mining conditions," 4-wheel drive and steer, right- or left-hand drive, and with or without elevating conveyor for transfer. The present car built for Pitt Consol conditions has a capacity of 8 tons and a 30-sec discharge rate. This rate can be varied as desired to fit the application, whether belt, car or other loading. The discharge conveyor can be operated and the elevating conveyor raised and lowered while the car is traveling. Travel and other operating rates can be varied by changing the gearing.

### Magnetic Separator

For recovery of magnetic media in heavy media separation plants, Stearns Magnetic Products is manufacturing the "WPD" magnetic drum separator, a unit

designed especially for recovery of magnetite or ferrosilicon media in coal and ore processing plants. Named the mode "M" separator, the unit produces a magnetic concentrate of high specific gravity,



even from non-densified slurry feeds, according to Stearns. In operation a permanent magnet assembly lifts out magnetic particles from the feed as it flows under a rotating arm. Better than 99% of the magnetite from coal slurry can be recovered automatically and economically, Stearns declares. Capacity is rated at an average 8 gpm per in of magnet width. Thus, a 30x45-in unit can be rated at 360 gpm. Stearns Magnetic Products, 635 S. 28th St., Milwaukee.



White Cottage Coal Company,  
White Cottage, Ohio



## 14,000 HOURS EACH — STILL NO MAJOR OVERHAUL THANKS TO CITIES SERVICE LUBRICANTS

### Shovel and dragline run 20 hours a day, seven days a week!

The two machines pictured above are part of the equipment used by White Cottage Coal Company in its strip-mining operation. Each works 20 hours a day, seven days a week. Each has given over 14,000 hours of performance without major overhaul. And each uses Cities Service Lubricants—C-300 Motor Oil, Trojan MP 140 Gear oil and Trojan A-1 Greases.

Says Superintendent Ralph Jameson: "That's the amazing kind of results we've been getting with Cities Service Lubricants ever since we first began to use them back in 1942. Today, they keep all of our equipment—shovels, draglines, bulldozers, and 18 dump trucks in top-notch condition. Cities Service products deserve a lot of credit for the efficiency of our strip operation, and I'd recommend them to any strip miner."

Like White Cottage and scores of other coal companies, you'll find Cities Service Lubricants can be an invaluable asset to you. For all the reasons, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



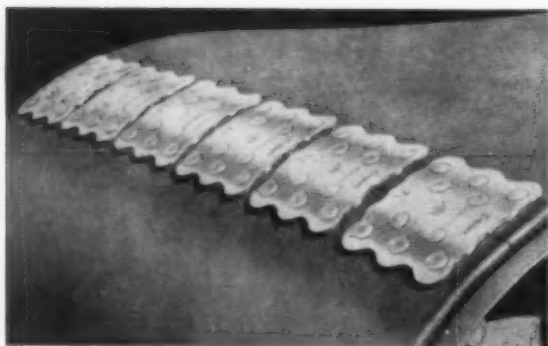
One of 18 Dump Trucks leaves load of stoker coal near railroad siding. White Cottage produces 100,000 tons per year, gives all equipment tremendous work-out to meet this production figure.



Bulldozer Clears Road for other equipment. Like its big brothers, the cranes and shovels, it provides flawless performance with top quality Cities Service Lubricants.

# CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Cross-section view of countersinking feature.

## Conveyor Belting Fasteners

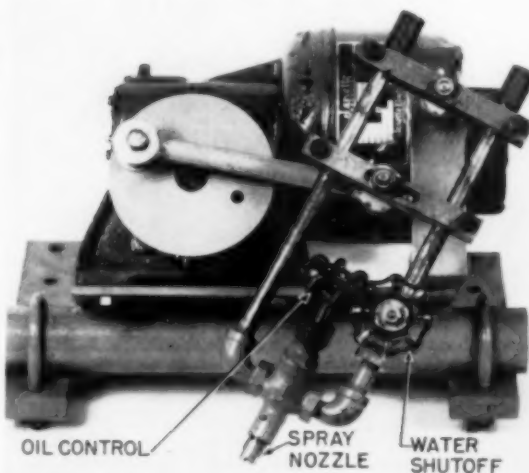
A New York manufacturer of belt fasteners, the Crescent Belt Fastener Co., 480 Lexington Ave., New York 17, N. Y., has introduced "Crescent" plates with countersunk holes, and special countersunk head rivets for attaching the plates. The advantages, according to the manufacturer: quick application, since a hammer is the only tool needed to join; longer life, because the countersunk-head rivets drive flush with the surface of the plates, thus reducing wear.



## Drill Utilizes Air or Water

Davey Compressor Co., Kent, Ohio, has announced an addition to its line of rotary drills. Designated model M-8AL, the drill is equipped with a special, long drill bar and mast and is capable of drilling 24-ft ledges without changing steels, accord-

ing to the company. Suitable for truck mounting, the drill utilizes both compressed air and high pressure water for drilling. The manufacturer says the unit will drill 6¼-in holes up to 600 ft with air (1,500 ft in mud). A Davey 500 cfm compressor supplies air for blast drilling. The unit's high pressure water pump is a heavy duty, duplex type. Both compressor and pump are driven by a GMC-471 engine mounted on a truck bed. A 5-speed transmission permits various speeds of operation. Davey recommends the M-8AL for shot and blastholes, structure testing, core drilling, etc.



## Oil, Water Coal Spray

Spraying washed coal with a momentary emulsion of water and spray oil is a recent development made possible by a new mixing valve, recently patented by C. E. Berry, Fairmont, W. Va., coal preparation engineer, and representative of Southland Co., producers of spray oil, and Viking Machinery Sales Corp. The desired quantity of spray oil at high pressure is metered through a needle valve into a stream of low pressure water passing through the body of the valve. The pressurized spray oil, striking the stream of water, creates the momentary emulsion which passes out through the spray nozzle. The water acts as a vehicle in directing the oil onto the coal. The water and oil quickly separate and the oil speeds drainage of the water from the coal, the inventor explains. The unit may be installed where conventional oil sprays are now used. Full details from Southland Co., Yazoo City, Miss.



## Dual Drilling Rig

A self-propelled dual drilling rig being manufactured by the Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.,



## D9 MOVES 350 YARDS OF OVERBURDEN PER HOUR 20 HOURS A DAY

When one machine handles 7000 cubic yards of dirt per day you've got production that pays off. This giant CAT® D9 Tractor, owned by Ferris Coal Company, East Palestine, Ohio, is used in backfilling and benching for the dragline. Shown here, equipped with a No. 9S Bulldozer, it's cutting away 20 feet of overburden to reach the bituminous coal.

The D9 works two 10-hour shifts per day, seven days a week. Ferris Coal Company tried that kind of schedule with tractors of another make and found that down time made them too expensive to operate. Here's their statement:

"We purchased our D9 after using competitive machines because we knew from experience with Caterpillar-built equipment that we would get good service and lower maintenance costs. We bought the D9 with the expectation of a bigger production schedule and we're getting it."

Now the new Turbocharged Caterpillar D9 Tractor

gives you even greater horsepower. Its drawbar capacity has been increased from 230 to 260 HP, and its flywheel horsepower from 286 to 320! *You can give this ruggedly built giant tougher jobs than any other tractor has ever tackled before.*

To match your requirements, your Caterpillar Dealer can supply the new D9 with either torque converter or direct drive with exclusive oil clutch. And his reliable parts and service are always at your call. Let him show you what the D9 can do on the job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

# CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NAME THE DATE...  
YOUR DEALER  
WILL DEMONSTRATE**

is said by the company to be capable of achieving one of the "most variable drilling patterns yet attained." The drill, the T286, is available with heavy feeds and two sizes of drifter drills and is designed for fast drilling speeds in hard formations and rough terrain. Le Roi is manufacturing the rig with either one or two Le Roi-Cleveland air feeds mounted on a crawler tractor powered with a 28-hp gasoline engine. Le Roi says that although the one-drill unit is comparable in price to competitive equipment, a buyer can make substantial savings by buying the dual drill rig, instead of two one-drill units. The T286 is equipped with a heavy-duty DR40 feed, which has a 10-ft travel and 8-ft steel change as standard equipment. The rig's two 7-ft arms, mounted on swivel heads, permit arcing the arms to provide a drilling pattern with a 24-ft spread. The radius of turn of each arm is 220 deg from the mounting posts. Thus, a variable drilling pattern is attained from one sitting.



### Body Designed to Withstand Impact

A new rock body that is designed to withstand the impacts of power shovels, chute loading and conveyor loading, is being constructed by the Galion Allsteel Body Co., Galion, Ohio. Offered in 6 to 15 cu yd capacities, the body is constructed of ¼-in steel plate in sides, floor and head. A ¼-in wear plate over a 2-in hardwood cushion protects the body floor, and a 4x4½ in reinforced top roll holds down shovel and loading damage to the body sides. Instead of a tail gate the body is designed with a 15-deg, 24-in scow end. Galion will build the unit with a heated floor for unusually sticky loads. Designed for mounting on Models 880 or 1000 underbody and model 77379 telescopic hoists, the unit's capacities range from 15 to 25 tons.



### Grader Built With Torque Converter

A torque converter model of the "660" motor grader has been added to the Adams line of graders by LeTourneau-Westinghouse Co., Peoria, Ill. Labeled the "Power-Flow 660," the unit is basically the same as the standard "660," except it is equipped with a torque converter drive train and has a 27% increase in engine power. LeTourneau-Westinghouse has installed a 190 hp diesel, a single stage converter and a four-range constant mesh transmission. Advantages, according to the

company, are: a flexibility of power, shock load cushioning, and reduction of mechanical wear. The new "660" is recommended for tougher grading jobs. It contains four forward speed ranges from .23 mph to 27.4 mph. In reverse its speeds range from .22 mph to 24.4 mph. A buyer has a choice of the Cummins HRFB1 600 diesel or the GM 6-71, both 190-hp units.



### Augering Recovery Conveyor

An improved version of the "Smoothflo" coal conveyor manufactured by the Fairfield Engineering Co., Portable Div., Marion, Ohio, is being marketed by the company. Designated model A-352, the unit reportedly is proving useful in a number of stripping operations where recovery augers are being used to tunnel out coal. Constructed with boom lengths from 25 ft to 40 ft, the conveyor also is being used for stockpiling. Fairfield points out these features: simplified hydraulic controls and hydraulic drives; three travel speeds forward, three in reverse. Fairfield adds that anyone can operate the A-352 with a mere five minutes of instruction. Power can be furnished with either gasoline engine or with electricity.

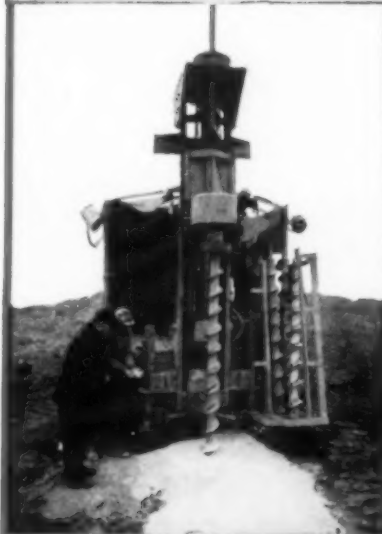


### Maker Boosts Power, Load Capacities

Increased power and load capacities, three-speed automatic transmissions, expanded power steering and power brakes are, perhaps, the chief features of the 1957 Dodge trucks. The new 900 six-wheeler above develops 232 hp and 355 lbs of foot torque. It is built with a 38,000-lb capacity rear axle unit, has a maximum gross vehicle weight of 46,000 lbs, and a maximum gross combination weight of 65,000 lb. In all, Dodge

# CUT MINING COSTS

WITH **HEAVY - RUGGED - POWERFUL**  
**McCarthy AUGER DRILLS**



## VERTICAL

MODEL 106-24

World's Fastest Heavy-Duty  
 Vertical Auger Drill

Bores faster, deeper, larger dia. holes than any other auger drill. New gear reduction unit slows auger rotation for operation in hard rock formations. Drills 8" and 9" dia. holes readily in shale and sandstone formations, drills larger dia. holes up to 24" dia. in softer formations.

Write for Bulletin M-100

## FINGER-TIP CONTROL



Gives Desired Rotating  
 Speed Of Auger

## HYDRAULIC FEED



Provides Any Speed Up To 6 Feet  
 Per Minute Horizontal  
 Feed Of Drill

## COAL RECOVERY

"Walks" from hole to hole to auger  
 high-quality Bonus Coal

An Ohio miner removes 300 tons of coal in each 6 1/2-hour working day with this Model 14 36-42 x 12' McCarthy drill, operated by two men. He drills 42" dia. holes 144' deep. Auxiliary conveyor eliminates spillage at hole. It operates on either side of drill for working blind cut. Twelve different models of McCarthy Coal Recovery Drills mine low-cost "bonus coal."

Write for Bulletin M-101 and M-102



## HORIZONTAL MODEL 104

Lowest Drilling Costs per  
 foot, Self-Propelled or  
 Truck-Mounted

Bores up to 12" dia. holes to 150' depth faster, cheaper than any other horizontal drill. Requires less working space, saves many man-hours. . . operates easily in tight, hard-to-reach locations.

Write for Bulletin M-105

**THE SALEM TOOL COMPANY**  
 763 SOUTH ELLSWORTH AVENUE  
 SALEM, OHIO, U. S. A.



is offering nine engines with 12 different horsepower ratings (from 113 to 232 hp) in its "K" series. The large four-wheel drive "Power Wagon" has an 18,000-lb gvw and is offered with the choice of a 197-hp V-8 engine or a 130-hp six-cylinder engine. The small "Power Wagon," also four-wheel drive, produces 113 hp and a maximum gvw of 9,500 lb.

## Plastic, Steel Mixture Repairs Metal

A mixture of steel (80%) and plastic (20%), developed for the metal working industry to make tools, jigs, fixtures and dies, is being recommended by the manufacturer, Devcon Corp., Danvers, Mass., as a machinery repairing material. The mixture, named "Devcon, The Plastic Steel," is said to be an "excellent adhesive" and bonds steel, iron, bronze, brass, aluminum and lead to themselves and to each other. It will also bond metals to glass, porcelain, concrete and wood, according to the company. Resistant to most acids, alkalis and chemicals, Devcon is being used by chemical plants, oil refineries, mines and power plants to repair pipes, tanks, valves and general industrial equipment. A large chemical company in Florida used Devcon to build up the inside surface of large centrifugal pumps worn away by abrasion and corrosive liquids. Two types are offered: Devcon A, a putty type that can be applied to a vertical surface and will not run or sag; and Devcon B, a viscous liquid that can be poured. Both types have a strength of approximately 18,000 psi, the manufacturer says. After application and two hours of hardening time Devcon can be machined like steel. Devcon Corp. recommends the product for rebuilding broken machinery, filling large and small holes in castings, building up worn metal surfaces on machine tools and similar applications. Once hard, Devcon can be sawed, drilled, threaded or ground with usual metal working tools, the manufacturer says.



## Four-Wheel Drive Tractor Shovels

The Frank G. Hough Co., Libertyville, Ill., has introduced two four-wheel drive, pneumatic tire-equipped "Payloador" tractor-shovels, the model HH with a payload capacity of 1½ cu yd, and model HU with a payload capacity of 1¼ cu yd. The HH, struck, will carry 1½ cu yd; the HU, struck, 1 cu yd. Both tractor-shovels are equipped with Hough's own "Payloadomatic" power shift transmission. With the transmission an operator is able to shift forward or reverse without slowing or stopping. A boom arm design that permits "pry-out" of a load, and a bucket action that provides 40 deg tip-back at ground

level are features of both units. During travel cycles the load is cushioned with a hydraulic system of shock absorption for faster movement and less spillage.



## Unified Line of Scrapers, Dozers

Clark Equipment Co., Construction Machinery Div., says it will start producing tractor scrapers and tractor dozers next year, as well as producing additions to the present line of "Michigan" tractor shovels. In the photo above the new Model 110 "Michigan" tractor scraper and the 180 tractor dozer have been teamed. Matched for size, the two units have interchangeable Clark power trains and engines. Clark, in fact, will begin to manufacture its tractor shovels, tractor dozers and scrapers as a "unified line of equipment" by standardizing power train components and thus permitting interchangeability. Ninety degree power steering in either direction will be a feature of all three scrapers planned by the manufacturer. The Model 110 (above) will make a 180-deg turn on a 30-ft roadbed. The 110 has an 8- to 10½-yd capacity; another, the Model 210, will have a 12.7 to 18-yd capacity; and a third, the Model 310, a 20- to 27-yd capacity. Top speed is 30 mph and all controls are fully hydraulic. Two rubber-tire equipped tractor dozers will be added to the "Michigan" line. To Clark's 1955 Model 180, will be added the 280 and 380. The 280 is a 38,000-lb machine with an 11-ft 3-in blade. The Model 380, is a 55,000-lb unit with a 13-ft, 3-in blade. Both dozers will be equipped with interchangeable power trains for the Models 210 and 310 scrapers. Cummins turbo-charged diesels will supply power.



## 24-Cu Yd Truck Has 400-Hp Engine

The truck above is Dart's new model 35SL, 35-ton unit, first introduced at the Mining Congress show in Los Angeles. It carries 24 cu yd (struck) and is powered by a 400-hp diesel. Its construction includes a down-hill retarding torque converter and a heavy-duty three-speed transmission. The Dart Truck Co., situated at 27th & Oak Sts., Kansas City, Mo., constructed the 35SL with a tubular, 50,000-lb front axle and its own triple reduction planetary 110,000-lb driving axle. Combined, the two axles exceed the 126,000-lb gross weight.

## High Pressure Lubricator

"Hydra-Luber," developed by A. E. Molinski, Johnstown, Pa., is a hydraulically-operated lubricating unit which



...they just keep rolling along!

**QCF mine cars for non-stop production**

Like Old Man River, an **QCF** Mine Car System just keeps rolling, delivering the tonnage with never an interruption. If a car needs repairs, you just shunt it aside... and the rest of the trip keeps right on hauling.

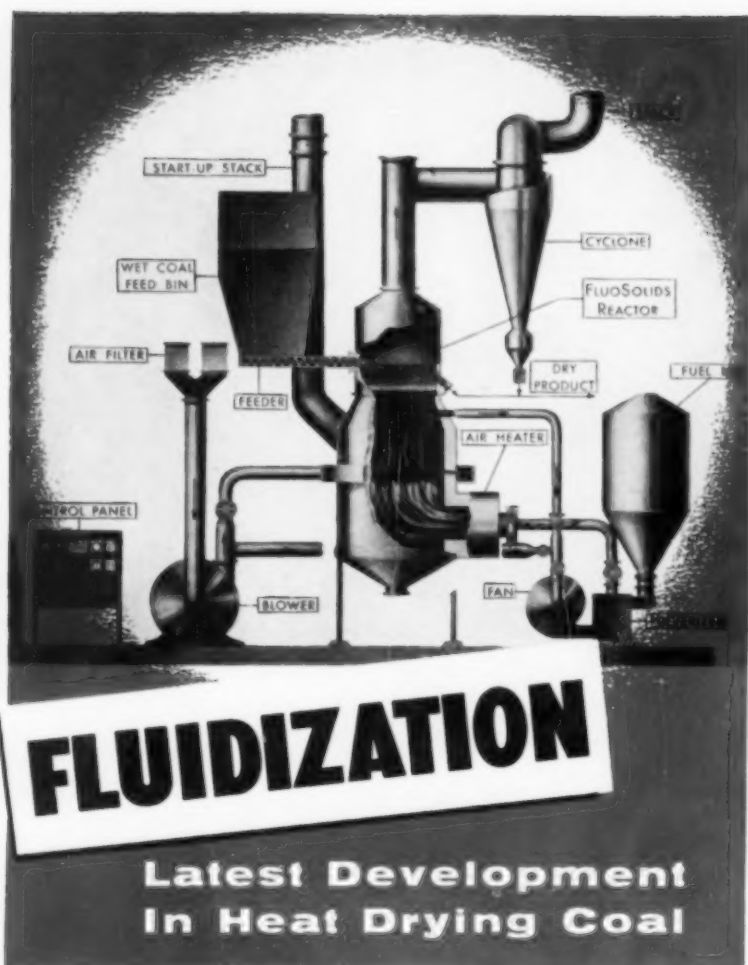
And mine car systems don't tie you down to a limited production rate; for more production merely use more cars. As you advance the face, just add new trackage, without stopping production. No expensive, complicated maintenance, either. Your own maintenance men can keep an

**QCF** Mine Car System healthy and productive. Cost and production figures recorded by operators prove the many advantages of **QCF** Constant Haulage Mine Car Systems. Ask your **QCF** representative for full information. Just write, wire, or phone any **QCF** office.

**AMERICAN CAR AND FOUNDRY DIVISION  
QCF Industries, Incorporated**

*Sales Offices:* New York • Chicago • St. Louis • Cleveland  
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**QCF MINE CARS**  
*for Constant Haulage*



Now available on a commercial scale, the Dorrco FluoSolids System provides a new and improved method for drying fine coal using fluid techniques. For the preparation plant it offers these proven advantages:

**HIGH CAPACITY** per unit area . . . up to 200 tons per hour in a single Reactor.

**CLOSE OPERATING CONTROL** and uniform bed temperature with no oxidation of the finished product.

**NO MOVING PARTS** inside the Reactor exposed to high temperature or abrasive dust . . . scaling and maintenance reduced to a minimum.

**HIGH DRYING EFFICIENCY** with each particle surrounded by a film of hot gas . . . vaporization practically instantaneous.

**START UP AND SHUT DOWN TIMES** easily meet preparation plant requirements.

For more information on this radical departure from conventional fine coal dryers, write for a copy of Bulletin No. 7503. Dorr-Oliver Incorporated, Stamford, Conn., U. S. A.

FluoSolids is a Trade Mark of Dorr-Oliver Inc. Reg. U. S. Patent Office



**DORR-OLIVER**  
INCORPORATED

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT  
STAMFORD • CONNECTICUT • U. S. A.

## Equipment News (Continued)

may be installed on mining or other equipment to provide positive high-pressure lubrication through manual application. Oil from the hydraulic system of the "mother" machine is pumped through a reducing valve to lower the pressure of the stream to 400 psi. The oil, at 400 psi, operates a horizontal piston-type grease pump, which is fed by gravity from a steel container holding



20 lb of grease. The pump forces grease through a hose at 8,400 psi into a manually-operated control valve at the end of the hose. The hose is made long enough to reach all grease fittings on the mother machine, and experience with the unit shows that a loading machine or continuous-mining machine can be serviced in about 15 min. A major advantage, the makers say, is that the service man can actually see whether or not a lubrication point takes the lubricant. Hydra-Luber is made by Quaker Sales Co., Johnstown, and distributed exclusively in bituminous-mining areas by Schroeder Bros., 3116 Penn Ave., Pittsburgh 1, Pa.



## Pressure Reducing Valves

Two low pressure reducing valves for industrial oil hydraulic systems are available from Vicker Inc., Box 302, Detroit 32, Mich. The units will provide any controlled reduced outlet pressure from 25 to 1,000 psi, the manufacturer says. Both are for use with 3/4-in pipe in systems having operating pressures up to

*TRUE! or FALSE:*

A **FAIRMONT** -Built Preparation  
Plant will improve your sales—  
increase your profit!

*TRUE!*

Results prove that coal sales and profits are directly influenced by the quality of the coal.



Good, clean, well-sized coal from a **FAIRMONT** -built Plant sells more readily at a better price . . . while a dirty, poorly graded product goes begging!

Check these facts with your operation . . . are you satisfied . . . or is the lack of a modern and efficient coal cleaning plant losing you sales—cutting your margin of profit?

Pick up the phone now—call us collect—and ask to have one of our trained preparation plant specialists stop by and explain the advantage of a **FAIRMONT** -built cleaning Plant.

*Qualified by 60 Years of Experience*



**FAIRMONT MACHINERY COMPANY**

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH  
WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

## Equipment News (Continued)

2,000 psi. Model XGL-03-B is a gasket mounted design; Model XTL-03-B is built with  $\frac{3}{4}$ -in pipe thread connections. Both are rated at 8 gpm.

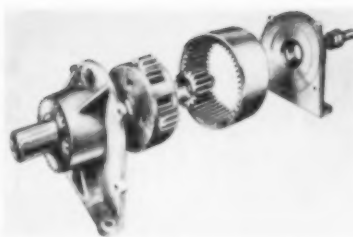
### Heavy Duty Scraper Hoist

A heavy duty scraper hoist, the "41," by Ingersoll-Rand, 11 Broadway, New York 4, N. Y., features I-R's "unit assembly" construction in which each unit (housing, rope drum, gearing, clutch)

is independent of the next unit. The hoist will handle single line rope pulls up to 9,900 lb. Double and triple drum units are available and can be arranged for overwinding or underwinding rope.

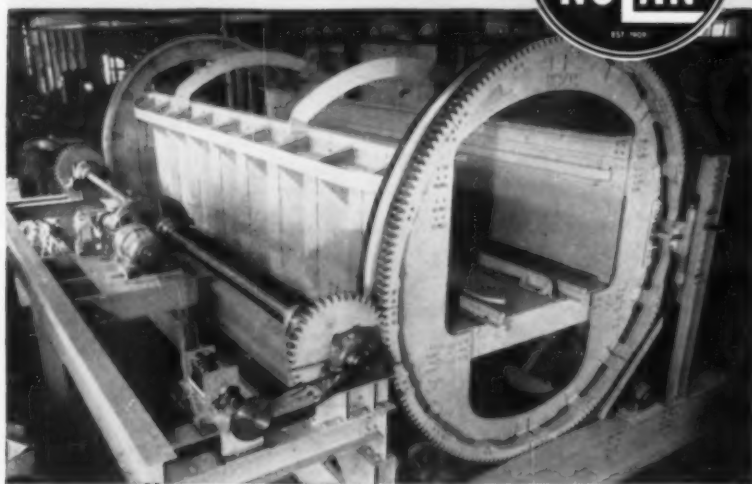
### Simplified Gear Reducer

A simply designed gear reducer that permits fewer parts, but covers the complete range of reduction ratios with one basic model is being manufactured by the Crichton Co., 1006 U. S. National Bank Bldg., Johnstown, Pa. The unit



covers ratio ranges from 3 to 1 up to 205 to 1 by changing the combination of standard planetary assemblies available. Each reducer consists of the basic housing with one, two or three planetary assemblies. All planetaries are interchangeable providing buyers with easy assembly, lower initial investment and wider power ranges, says Crichton.

## THE NEWEST in Rotary Car Dumpers



### Safe, High Speed Dumping thru Full 360° Arc Fully Automatic with Selective Manual Control

#### NOLAN AGENTS:

George C. Hutchinson, Jr.  
1304 Keenan Building  
Pittsburgh, Pennsylvania  
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429 South 24th Street  
Birmingham 5, Alabama  
John North Associates  
P.O. Box 105  
Marbert, Michigan  
(Chicago District)

This is the latest in car dumper engineering, and includes advancements made as the result of nearly 50 years experience in mine car dumping and control equipment.

#### FEATURES:

- Designed for Today's High Capacity Mine Car
- Gear Driven through Flame-Hardened Gears
- Complete with base frame, dump sheets, and liner plates
- Anti-friction Bearings throughout
- Wide Faced Dump Rings of Special Alloy Steel
- Equipped with Nolan Patented Cushioned Rail Aligning Stop

Write for details on this new NOLAN Car Dumper, and ask us to help solve your car control problems.

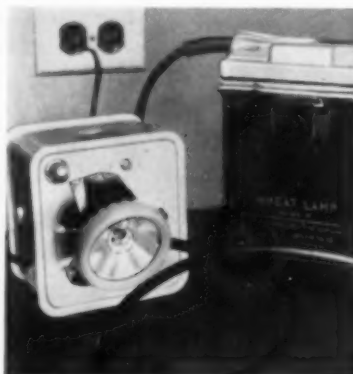
### THE NOLAN COMPANY

Bowerston, Ohio



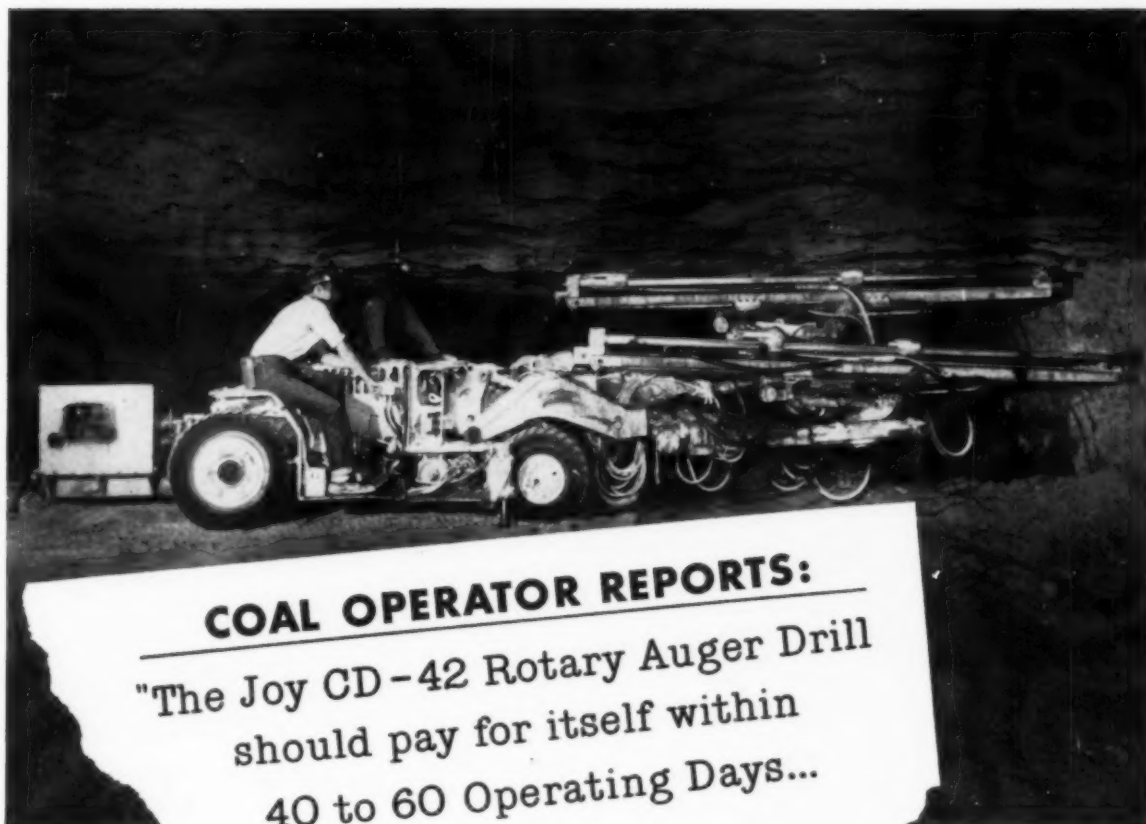
### Hard Rubber Fog Nozzles

A line of hard rubber fog nozzles said to be non-clogging and corrosion resistant using almost any spray is being manufactured by Bete Fog Nozzle, Inc., Greenfield, Mass. Because of their reported immunity to most chemical substances, the nozzles are recommended by the manufacturer for use where corrosive conditions prevent the use of metal or some non-metallic materials. Named the "HR Series," the nozzles are spirally designed, one piece and are available in 10 models from the narrow angle (50 deg) to the wide angle (120 deg) hollow cone spray pattern. Buyers also have a choice of five flow rates—5 to 50 gpm.



### Automatic Lamp Charger

A new Wheat automatic single-lamp charged for Wheat electric cap lamps is being produced by the National Mine Service Co., Indiana, Pa. The charger eliminates the need to inspect charging.



## COAL OPERATOR REPORTS:

"The Joy CD-42 Rotary Auger Drill should pay for itself within 40 to 60 Operating Days..."

... In an 8 unit mine, working double shift, the CD-42 has drilled as many as 28 places in a shift, with an average of 9 holes per place. How?

**POSITIVE SPOTTING OF HOLE**—drill frame drives two prick points into the seam—frame is then locked into position while auger is fed out and retracted. Floor jacks keep drill stable.

**CONTINUOUS AUGER FEED**—10 foot auger steel eliminates changing of augers. The higher the seam, the greater the time saved.

**COMPLETE SAFETY**—operators stay at controls—always away from the face.

Get details from **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.**  
In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**



Write for  
FREE Bulletin 139-1



*Consult a Joy Engineer*

## SINGLE BOOM MODEL CD-41



*The CD-41, with single boom, drills 16 feet wide and from 4" to 9' 6" from the floor without moving the machine. A special model is available for higher seams. Thrust of 1500-1800 lbs. drills at speeds up to 10 fpm.*

# JOY

WORLD'S LARGEST MANUFACTURER OF  
UNDERGROUND MINING EQUIPMENT

WOW CL 6281-139

## Economical Cleaning for High or Normal Refuse Fine Coals



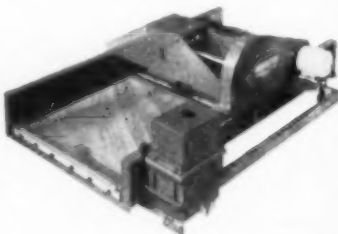
Now a SuperDuty® DIAGONAL-DECK® Coal Washing Table (Model HCRD) is made especially for the efficient cleaning of high refuse coal feeds. It provides extra discharge capacity so that the overall cleaning efficiency is comparable to that of the time proved standard model which has won so much favor on normal refuse feeds.

Both tables make use of the famous Super-Duty deck action that delivers highest grade washed coal products with negligible loss to the refuse. Operating singly or in a large battery, the efficiency is exactly the same. Both small and large operators find them highly profitable.

Send for Bulletin 119.

### FOR SCREENING ECONOMY

All New Model Leahy® screens utilize proven differential vibration that snaps oversize wedging particles loose 1600 times per minute. When dust is a problem, totally enclosed models are available. For damp screening, Flex-Elex electric heating of the screen jacket insures full-time open mesh. For wet screening CONCENCO® spray nozzle arrangements are your best choice.



THE DEISTER ★  
**CONCENTRATOR**  
COMPANY

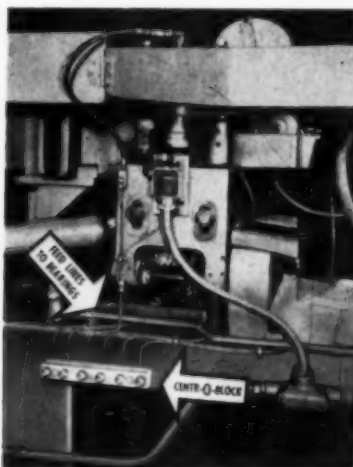
903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

**CONCENCO**  
PRODUCTS

★ The ORIGINAL Deister Company ★ Est. 1906

## Equipment News (Continued)

since current is automatically reduced to a low rate when the lamp battery is fully charged. A pilot light, lit when the battery is on charge, goes out when a full charge has been reached. But, even when fully charged, says National Mine Service, the battery may be left connected to the charger without harmful effect.



### Small Machine Lubrication

Centralized lubrication for even the smallest machines is possible with a low-cost system recently developed by Lincoln Engineering Co., 5729 Natural Bridge Ave., St. Louis 20, Mo. The system consists of one or more manifold blocks threaded for insertion of standard hydraulic grease fittings. The blocks are bolted to the most easily accessible location on the machine. Rigid or flexible feed lines connect bearings to inlet ports of the blocks. Fittings can be contacted by any standard application device, manually or power-operated, such as lever guns, bucket pumps or power lubricators.



### Portable pH Recorder

Portable, self-contained, pH measuring and recording instruments requiring no external power supply are being made by the Bristol Co., Waterbury 20, Conn., for field surveys of stream pollution, waste-treatment plant effluent, and indus-

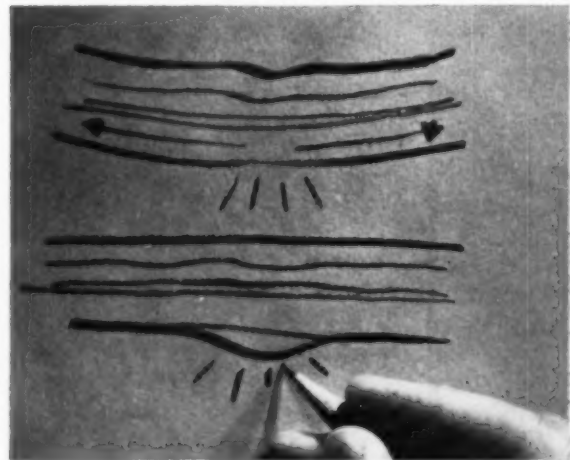
# Rome's shuttle car cable can't be bent the wrong way!



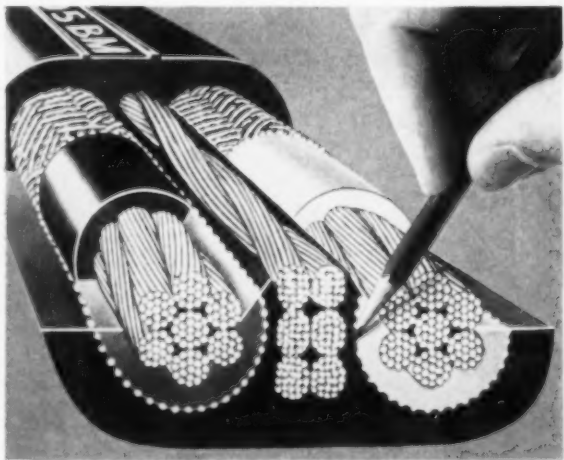
**JUST TRY TO BEND IT THE WRONG WAY.** Force a length of Rome 60 Parallel Duplex to bend along its major axis—if you can! You'll discover that you can't put a damaging wrong-way bend in this tough cable—and neither can obstructions on the floor of your mine.



**NO DAMAGING BEND—JUST A FLIP-OVER.** When flexed in use, Rome's Duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, not a breakdown. This means that the power keeps coming through, and your coal production remains high.



**WHAT HAPPENS TO OTHER CABLES.** Wrong-way bends on ordinary shuttle car cables often cause conductors to slip, causing distortion. One side of the cable may stretch, the other crimp. Result: a *weak spot*. Further flexing, tension, or twisting turns the weak spot into a breakdown. Coal production then falls behind.



**WHY ROME'S DUPLEX BENDS THE RIGHT WAY.** Open braid around each insulated conductor forms a crisscross tread-like surface—one that won't slip. The tough Neoprene jacket and braided conductors, meshed together, bend just one way. The interlocked construction assures the right bend, and power keeps coming through.

Send for your **FREE sample!** Put a two-foot sample length through this same test yourself. See how Rome 60 Parallel Duplex simply can't be bent the wrong way. Ask your nearest Rome Cable representative for your free sample—or write to Department 502-B, Rome Cable Corporation, Rome, New York.

## ROME CABLE

C O R P O R A T I O N

## Conqueror of the FUTURE...



### MORRIS meets the CHALLENGE of INDUSTRY'S NEW FRONTIERS

No Matter What Your Present or Future Heavy Pumping Problems Are . . . Morris Can Satisfy You NOW!

The new Morris Type RX Slurry Pump is specifically engineered to handle the viscosities, densities and special characteristics of the slurries and sludges developing from industry's ever-advancing products. It is engineering attuned to the future . . . designed to meet the demands of a towering tomorrow.

**Rugged, Dependable, Trouble-Free; Operates With Minimum Attention . . . Cuts Maintenance Costs!**

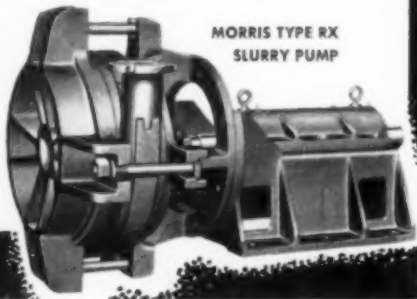
The new Morris RX is designed for performance perfection under all conditions, including heavy, coarse, fine slurries, dispersions and sludges. Operates at low speeds; quickly dismantled for inspection, avoiding lengthy lay-up time.

#### MORRIS MACHINE WORKS

Baldwinsville, N. Y. Sales Offices in Principal Cities

**FREE SERVICE:** Morris engineers will gladly recommend the custom-made pump best suited to your needs. Send necessary data today.

**MORRIS**  
CENTRIFUGAL  
PUMPS



MORRIS TYPE RX  
SLURRY PUMP

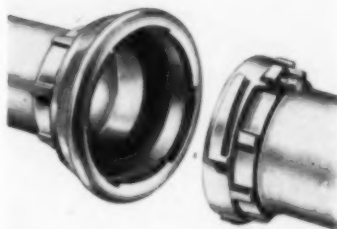
#### Equipment News (Continued)

trial water supplies, as well as in-plant studies at locations where a permanently mounted recorder is impractical. The device consists of two units: a Bristol Model 524 pH recorder and a Beckman N-2 amplifier. With the equipment the total pH range of 0-14 in two partial ranges of 0-8 and 6-14 can be covered. Together the two units weight less than 50 lb.



#### Rotary Compressor

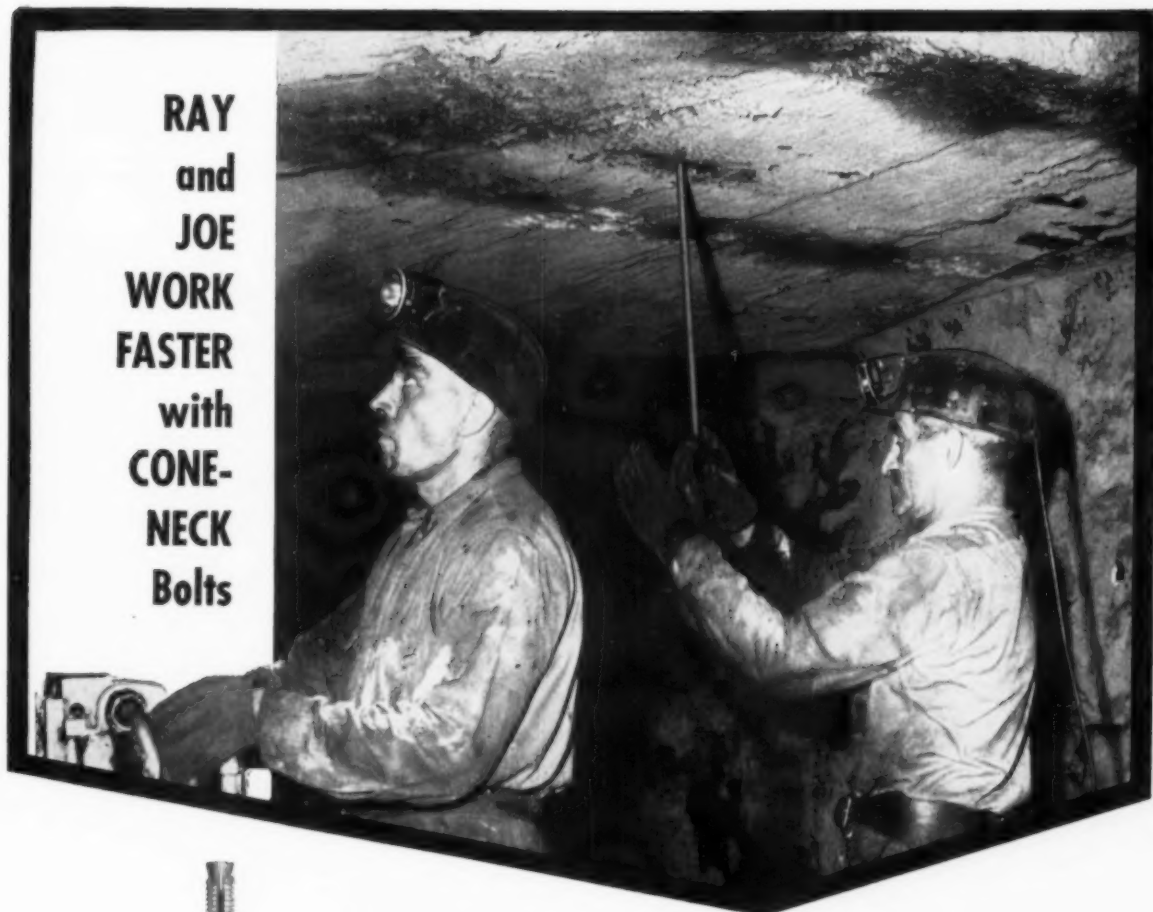
A 5-hp, tank-mounted, rotary compressor for general applications is being manufactured by Davey Compressor Co., Kent, Ohio, under the name "Hydrovane." The unit is built with a displacement of 21 cfm and is directly connected to its 1,800 rpm, electric motor. Maximum working pressure is 200 psi for continuous operation. For intermittent use, the compressor may be operated at 250 psi.



#### Portable Pipe Coupler

An industrial coupler for portable aluminum pipelines that will withstand pressures up to 1,000 psi is being manufactured by the John Bean Div., Food Machinery & Chemical Corp., San Jose.

**RAY  
and  
JOE  
WORK  
FASTER  
with  
CONE-  
NECK  
Bolts**



**better bolting crews agree . . .**

*installation is faster . . . easier with* **CONE-NECKS!**

Raphael Swisher and Joe Palma are one of the many fine bolting crews using West Virginia roof bolts. They have no problems keeping ahead of the cutting and shooting crews using West Virginia Cone-Neck roof bolts.

Cone-Neck bolts are much easier to install. There's no on-the-job assembly problem, because the washer slides on over the unit.



**CONE-NECK CONSTRUCTION**

It's guaranteed safer because the washer fits centrally and closely.

**2** unit styles available

Style "R" shown  
Wedge-grip also available

**West Virginia Works  
CONNORS STEEL DIVISION  
H. K. PORTER COMPANY**

**HKP**



**Here's How You Can Save  
Time & Money inspecting—  
cleaning—relocating  
Your Pipe Lines**

## ALUMIRON COUPLINGS for grooved end pipe

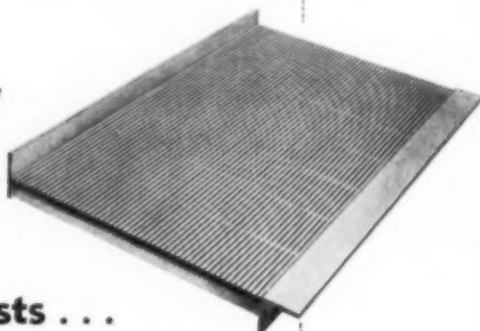
- Cut material and labor costs by using these malleable iron and aluminum couplings on your steel, aluminum, cast iron, wrought iron and spiral weld pipe.
- Pipelines become "portable" when you couple them with Alumiron Couplings—quickly couple or uncouple them by means of two bolts through the coupling halves. A leak proof seal is easily made by pulling up the two half housings with a socket wrench.
- The flexibility of the Coupling corrects for slight piping misalignment and permits the line to adjust to the slope and unevenness of the ground.
- Furnished with Buna N or Neoprene gaskets designed to produce a leak tight seal which increases as the vacuum or pressure increases up to 1000 lbs.
- Stocked in 2, 3, 4, 6 and 8 inch sizes. Other sizes on request.



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screening  
costs . . .**



Replace your present screens with Hendrick Wedge Slot . . . the continuous slot screen that can't be beaten for screening and dewatering operations. Hendrick Wedge-Slot has small openings yet affords far greater draining and screening capacity.

Profile bars are shaped to maintain uniform width of slot openings as wear progresses. Long screen life and high coal quality are always maintained. For information on the type of Wedge-Slot best suited to your particular operating methods, call Hendrick today!

Perforated Metal  
• Perforated Metal  
Screens • Wedge-Slot  
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Wedge-Wire Screens  
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• Armorgrids •  
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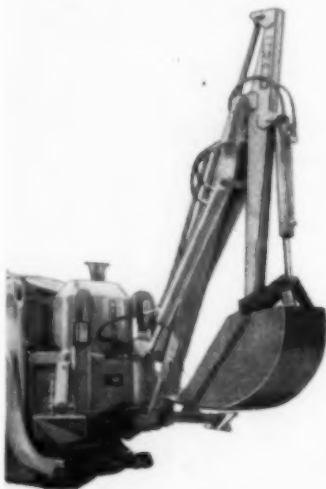
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MANUFACTURING COMPANY  
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See our  
Catalog in  
SWEETS

## Equipment News (Continued)

Calif. Breach-acting jaws secure the coupler in a quarter turn. A lock screw holds against line torque. The company points out that no metal part of the coupling is exposed to material within the line. Instead a pressure sealing gasket is used to protect the metal and to hold down friction.



## Back Hoe Attachment

The Wain-Roy Corp., Hubbardston, Mass., is manufacturing a back hoe designed for use with the models HH and HU, four-wheel drive "Payloader" tractor-shovels. The 3/4-yd hoe is an independent unit and is attached to the Payloader boom arm with two pins and hydraulic hose connections. Wain-Roy says the unit will dig and dump at a radius of 190 deg, a feature that permits it to work in congested areas. The hoe's digging reach is 12 ft 4 in, which permits it to reach to a depth of 13 ft and load to a height of 9 ft.



## Electric Rotary Hammer

The Demo-Haines Tool Corp., N. 10th Machine Works, Enid, Okla., is pro-



## CINCINNATI DUPLEX CHAIN AND BIT

The Cincinnati Duplex Chain and the Duplex Bit is recommended for maximum cutting efficiency and for use on all types of cutting machines.

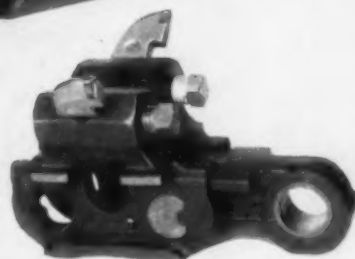
# "CINCINNATI MINE" offers you **MORE!**

- 1 MORE EXPERIENCE . . . over a quarter century of Specialization and Research in the design and manufacture of Coal Cutting Equipment.
- 2 MORE COMPLETE LINE of Chains, Bits and Bars for all types of CONVENTIONAL or CONTINUOUS Mining Machines.
- 3 MORE EXPERIENCE AND SKILL IN HEAT TREATING . . . we operate our own Heat Treating Department. This guarantees you cutting equipment made to give longer life at lower cost . . . to meet your particular cutting problem.
- 4 MORE EMPHASIS ON STUDYING THE NEEDS AND REQUIREMENTS, both present and future, of the coal industry. We are now designing and planning cutting equipment for use on many machines only now in the development and testing stage.
- 5 MORE PERSONAL PRACTICAL SERVICE through our highly trained and experienced representatives conveniently located throughout the territory.

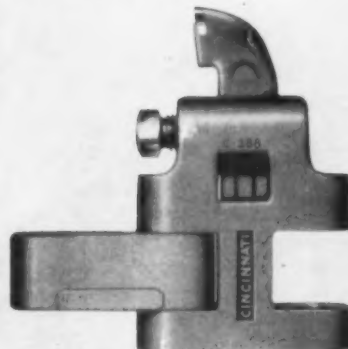
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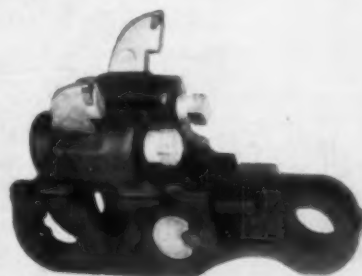
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Birmingham, Ala.  
UNION SUPPLY CO.  
Denver, Colo.



TYPE 185-WF . . . used on Joy Continuous Mining Machines where flanges are required . . . either the 5-chain Ripper Head or the 2-chain Rotary Head.



STANDARD KERF TRIMMING CHAIN . . . for use on the boring type Continuous Miner.



Type 185 . . . used on Joy Continuous Mining Machines where flanges are NOT required . . . either the 5-chain Ripper Head or the 2-chain Rotary Head.

*the* **CINCINNATI MINE MACHINERY CO.**  
CINCINNATI 25, OHIO

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## MATCHES TOOL SETS TO YOUR SPECIFIC NEEDS



MECHANICS STANDARD SERVICE SET No. 5166 GS-B

**Y**ou can get a Snap-on tool set with the right kind of tools to fit your job needs exactly.

Snap-on assembles special tool sets for a wide range of industries including automotive, aviation, construction, mining, petroleum and railroad. Tools for each industry are chosen as a result of years of experience with users in each of these fields.

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**Write for your free catalog.** Write today for your copy of the new Snap-on Catalog V, listing more than 4,000 hand and bench tools.

\*Snap-on is the trademark of Snap-on Tools Corporation.

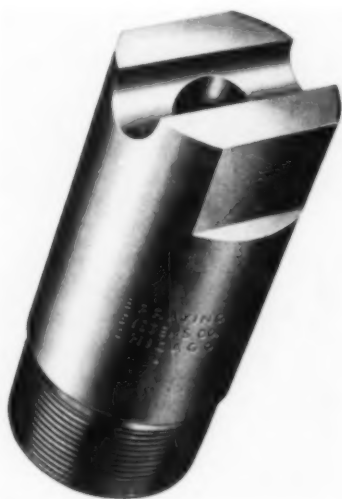
### SNAP-ON TOOLS CORPORATION

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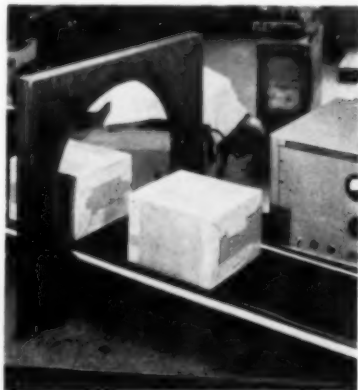
### Equipment News (Continued)

during a portable electric rotary hammer that creates 36,000 shock waves per min. The company says the unit will cut a clean, true hole up to 40 ft through the hardest stone, rock or reinforced concrete. Its weight is about 10 lb and, says Demo-Haines, the drill requires no pressure to use. Designed for drilling  $\frac{3}{16}$ -in to 1 $\frac{1}{2}$ -in holes, the drill is built with a Thor 115-v AC or DC motor that operates at 1,000 rpm.



### Spray Nozzle

Spraying Systems Co., Bellwood, Ill., is manufacturing a large capacity, flat spray nozzle as part of its Veejet line. Dubbed the 2-U-Veejet, the nozzle's capacity ranges from 73 gpm at 15 psi to 330 gpm at 300 psi. It is made in two types of spray angles, is free of cores, vanes and obstructions.



### Tramp Metal Detector

The J. W. Dice Co., Englewood, N. J., says its new Model TM metal detector automatically signals the presence of unwanted tramp metal particles hidden in non-metallic materials. Sensitive to both ferrous and non-ferrous metal, the detector operates a reject relay which can be used to sound a warning gong.

## Equipment News (Continued)

trigger a marking device and operate a reject gate.

### Free Bulletins

**WELDED STEEL SCREENS**—The selection of welded steel screens and their adaptation to coal processing equipment are the subjects of a 28-p booklet published by the Bixby-Zimmer Engineering Co., 961 Abingdon St., Galesburg, Ill. "Bee-Zee Screens Make You Money" covers vibrators, conveyors, feeders, shakers, filters and driers. Technical data, including the weight per square foot of screen, open area and comparative screen area, are featured.

**ACID HANDLING PUMP**—Dorr-Oliver, Inc., Barry PL, Stamford, Conn., will send on request copies of Bulletin 5004 describing the Olivite acid handling pump. Information includes design features, corrosion-resistant construction materials, applications, sizes and capacities.

**SHOVEL CRANES**—Book 2577, published by the Link-Belt Speeder Corp., Cedar Rapids, Ia., contains information on the company's line of shovel cranes. Facts on 18 crawler-mounted models from ½ to 3-yd, 8- to 75-ton capacities are featured.

**FASTENINGS**—Cost-saving ideas for users of corrosion-resistant fastenings are included in a 24-p semi-technical "Flo-Form" brochure published by the H. M. Harper Co., Morton Grove, Ill. Harper specializes in cold and hot formed stainless steel and non-ferrous fastenings. Some of the thousands of special fastenings being produced by the company are described and illustrated.

**REDUCTION MILLS**—Hardinge Co. Inc., 240 Arch St., York, Pa., has issued bulletin AH-474 covering the company's major types of reduction mills for both wet and dry grinding and pulverizing. Described are Tricone, rod, cylindrical, tube, batch, conical and disc-roll mills.

**V-BELTS**—Construction features of the "Texrope" grommet V-belt manufactured by Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee, Wis., are covered in Bulletin 20B6497C. The company says the belt has ¼% shrinkage, ¼% stretch.

**VIBRATING SCREEN**—Model XH vibrating screen for handling coal up to 8 and 24 in is described in Bulletin 07B6151D by Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee, Wis. Allis-Chalmers says the screen is used primarily in scalping, following large jaw or gyratory crushers.



**ELECTRICAL, MECHANICAL PRODUCTS**—Holub Industries Catalog 12 covers more than 400 items in the "Hi"

## The strongest rack bar makes the toughest jack



Long a favorite with coal miners is the 516 MT. It can raise 5 tons up to 9½ inches, is only 16 inches high when closed, has the famous oblong rack bar for greater strength and dependability.

A ratchet jack like the Duff-Norton all-purpose 516 MT is no stronger than its rack bar, the notched steel "heart" that moves up and down holding the load. The forged steel rack bar on this 5-ton capacity coal mining jack is stronger and tougher than the rack bar on any other ratchet jack of this type. It's *stronger* because it's *larger*!

Next time you see a Duff-Norton jack, examine the rack bar; you'll notice it's oblong like this . Then look at the rack bar on any other make ratchet jack. It's smaller, like this .

So get the most and best for your money with a Duff-Norton Jack.

Ask your distributor for information about Duff-Norton Jacks for coal mines. There's a jack for every lifting, pulling, and pushing job . . . or write the world's oldest and largest manufacturer of lifting jacks for your copy of "A Handy Guide for Selecting Duff-Norton Mine Jacks." Ask for bulletin Ad 10-J, Duff-Norton Company, P.O. Box 1889, Pittsburgh 30, Penna.

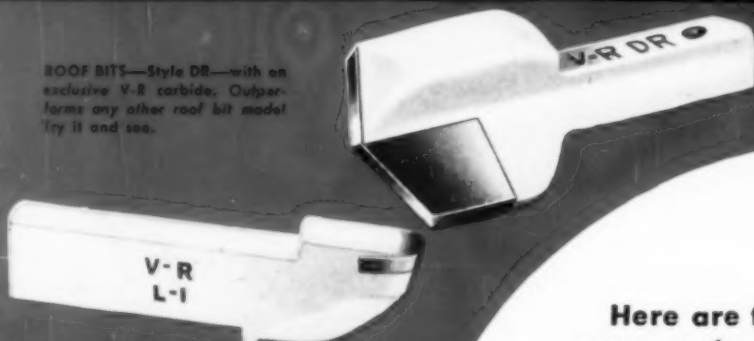
# DUFF-NORTON Jacks

"Giving Industry A Lift Since 1883"

# Lower your costs with V-R BITS



**ROOF BITS—Style DB**—with an exclusive V-R carbide. Outperforms any other roof bit model. Try it and see.



**LONG SHANK CUTTER BIT**—Style L-1. Designed specifically for latest style miners. Cuts faster with less drag. Designed for solid mounting with longer life.

**IMPROVED DESIGN CHAIN BIT**—Style CM. For continuous miners. The flange seats tightly against the rug, prevents wobbling, minimizes carbide breakage. No other bit can beat it!



**NEW ROTARY MINER BIT**—Style CML-3—best bit yet for rotary style miners. Cuts faster with greatly reduced pressure. Free cutting action due to special bit design—reduces bit cost per ton.



**AUGER BITS for Your Local Conditions.**

Style D—available in two carbide grades, one for hard formations, one for abrasive.

Style DB—for hard, rough cutting.  
Style DL—for non-coring coal.

**Here are the reasons why more and more mines are finding that V-R Bits are their best buy:**

**Sold and Serviced by Mining Men**—your V-R representative is a mining man. His years of experience will help you get the right bit for the job . . . will help you use it to your best advantage.

**Exclusive V-R Carbides**—a bit is no better than its carbide. V-R has pioneered the development and manufacture of carbides since 1932. Over 23 years of specialized experience in this field.

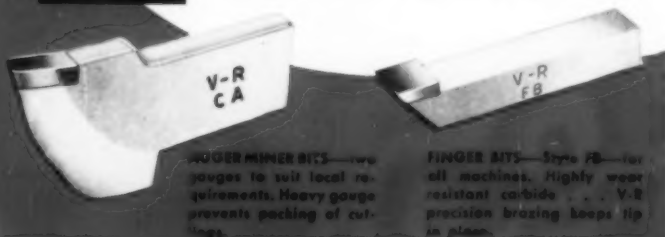
**Local Stocks . . . Local Service**—in most major mining centers. V-R offers fast delivery so you can carry less inventory. And, you'll get prompt local V-R service.

Buy the bits that are best of all. Write for literature.



**VASCOLOY-RAMET CORPORATION**

812 Market St., Waukegan, Illinois



**HEAVY MINER BITS**—two gauges to suit local requirements. Heavy gauge prevents packing of cuttings.

**FINGER BITS**—Style FB—for all machines. Highly wear resistant carbide . . . V-R precision brazing keeps tip in place.

## Equipment News (Continued)

line of electrical and mechanical products and equipment, e.g. wire connectors, metal straps, fish tape winder, screw anchors, toggle bolts, masonry drills, etc. Address: Holub Industries, Inc., Sycamore, Ill.

**CENTRIFUGAL PUMPS**—The Allen-Sherman-Hoff Pump Co.'s Brochure No. 956 is one of the first reports on the A-S-H line of pumps. It features the interchangeable Hydrosel and Centrisel rubber-line slurry pumps that give the user a choice between Hydrosel's protective flow of sealing water and Centrisel's ability to deliver abrasive or corrosive pulps undiluted. 259 E. Lancaster Ave., Wynnewood, Pa.

**LIFTING CRANE**—Facts on the 35-ton Lorain Moto-Crane, Model MC-530W, are contained in a 16-p catalog published by the Thew Shovel Co., Lorain, Ohio. The bulletin reviews new developments offered as standard equipment, e.g. the "shear-ball" mountings.

**SOUND-POWERED TELEPHONES**—Catalog 400D, published by the United States Instrument Corp., Box 33A, Charlottesville, Va., is a comprehensive account of the company's sound powered telephone systems in which the user's voice supplies the power needed to operate. Features: no static, no voice distortion and a 30-mi transmission range.

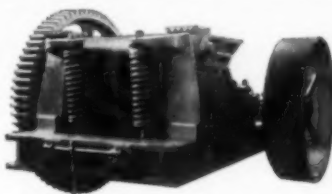
**MANAGEMENT, RECORDS CONTROL**—Remington Rand Div., Sperry Rand Corp., 315 4th Ave., New York 10, N. Y., has advice for decreasing operating costs and achieving greater profits—all contained in an 8-p booklet titled "These White Elephants Are Made of Paper." Various methods of improving management and records control are outlined.

**METAL JOINTS**—Detroit Bevel Gear Co., 8130 Joseph Campau, Detroit 11, Mich., is distributing an 8-p catalog containing information on the company's line of "Almetal Joints." Performance characteristics, applications and engineering dimensions are included.

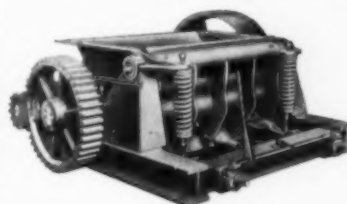
**SEPARATION MAGNETS**—Five types of suspended separation magnets for tramp iron removal are described in Bulletin 1031 by Stearns Magnetic Products, Div. of Indiana Steel Products Co., 635 S. 28th St., Milwaukee 46, Wis. Selection of the proper magnet is one of the bulletin's features.

**SKID-SHOVELS AND ATTACHMENTS**—International Harvester Co. is distributing six pieces of literature covering the International Drott skid-shovels and attachments. The entire line is described. Bulletin K-656 is a 16-p general catalog; Bulletin A-100 covers the "Skid-Grapple"; A-200 covers the grubber blade booklet; A-400, the Bull-angledozer blade sheet; A-500, the rock

# for the MOST DEPENDABLE, MOST ECONOMICAL COAL CRUSHING EQUIPMENT *Specify* **McLANAHAN**

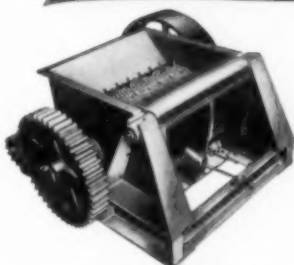


Single Roll Rockmaster Crusher for both primary and secondary crushing of rock and mine refuse. Bulletin RM-505.

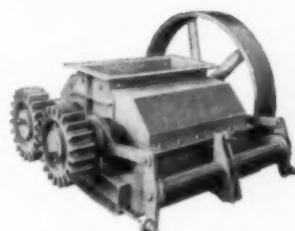


Single Roll Black Diamond Crusher with exclusive automatic steelstrut toggle and quick adjustment. Bulletin BD-437.

*write today for bulletins*



The low cost McLanahan Bantam Buster Single Roll Crusher. Bulletin BB-5112.



McLanahan Black Diamond Double Roll Crusher for various reductions of medium-size feeds. Bulletin BDDR-255 (for coal) and DR-155 (for rock).

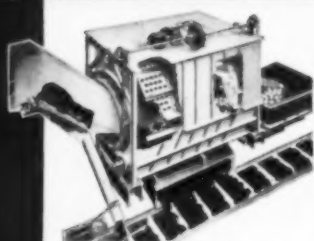
Backed by 120 years of manufacturing experience, McLanahan builds crushing equipment for the ultimate in economy through long service and minimum maintenance costs. This equipment, which has been thoroughly service-proven on the most demanding of domestic and foreign installations, is available in a variety of sizes for every coal crushing requirement. McLanahan is equipped to produce complete units, from feeders, primary and reduction crushers through elevators, sizing screens, etc.

**McLANAHAN & STONE  
CORPORATION**

*PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835*

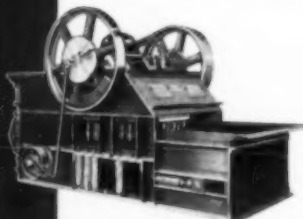
230 Wall Street, Hollidaysburg, Pennsylvania

## America's most complete line of CRUSHING EQUIPMENT



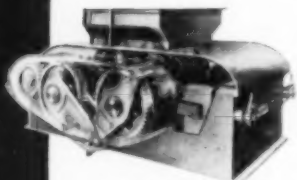
**McNally Pittsburgh  
Rotary Breaker**

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



**McNally Norton Vertical  
Pick Breaker**

50% less fines when reducing lump to egg and stove sizes.



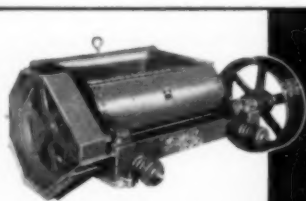
**McNally Double Roll  
Gearmatic ROM Breaker**

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.



**McNally Gearmatic Stoker  
Coal Crusher**

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



**McNally Single Roll Crusher**  
Universal application 20", 24" and 36" diameter rolls.

### AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

# McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas

Wellston, Ohio

## Equipment News (Continued)

fork sheet; and A-300, the scarifier sheet.

**INSULATION TAPE** — "Scotchrap" brand pipe insulation tape, manufactured to protect underground pipe from corrosion, is the subject of a booklet named "Tape It Easy," a 24-pager that provides instructions for wrapping bends, elbows and short sections, patching pipe, and preparing joint surfaces for wrapping. Minnesota Mining & Mfg. Co., Dept. D6-262, 900 Fauquier St., St. Paul, Minn.

**GREASES**—Sun Oil Co. technical Bulletins 49 and 50 provide information on water resistant, extreme pressure greases for shock-loaded bearings and on a new line of premium greases (Sun Prestige-40 Series) for use where water, high temperatures, or both, neutralize lower grade greases. Sun Oil Co., Philadelphia 3, Pa.

**LARGE SIZE NUTS**—A new line of large nuts being manufactured by the Security Locknut Corp., Melrose Park, Ill., is described in "Large Nuts," a catalog distributed by the company. Nuts 2 in and over are stocked, according to the catalog.

**PLASTIC FOR THE LAB**—Plastic supplies for laboratories are catalogued in booklet E956 being distributed by the Palo Laboratory Supplies, 61 Reade St., New York 7, N. Y. The supplies are made of polyethylene polyurethane, polyvinyl and nylon. Listed are such lab needs as beakers, bottles, containers, flasks, funnels, jars, pails, rinsers, spigots, tanks and tubes.

**COUPLINGS**—Catalog V-169-E, distributed by the Browning Mfg. Co., Maysville, Ky., contains illustrations and descriptions of rigid and flexible type couplings, fixed bore type flexible, bushed type flexible, bushed type rigid, bushed

type chain and a new line of minimum bore (reborable) chain couplings.

**DRIVES**—A 44-p booklet carrying a quick-selection table of variable speed "Texrope" drives has been announced by the Allis-Chalmers Mfg. Co., Industries Group, Milwaukee 1, Wis. Included is information on Vari-Pitch sheaves in combination and accessory equipment for the Vari-Pitch drive.

**POWER STEERING**—Mechanical and operational data, exploded views and specifications of Oliver power-turn steering are contained in Bulletin A-1044, published by The Oliver Corp., 400 W. Madison St., Chicago, Ill. The maker says "Power-Turn" permits tractor operators to make spot turns, gradual turns and to vary speed and pulling power without declutching.

**STEEL BUILDINGS**—A bulletin from Armco Drainage & Metal Products, Inc., Middletown, Ohio, describes truss-type steel buildings for large structural requirements. Clear-span widths range up to 100 ft with areas from 4,800 sq ft up. Dimensions and specifications accompany drawings. Bulletin SX-14156.

**FLEXIBLE COUPLINGS**—Torsionally flexible, Morflex couplings are fully described in a new 24-p catalog being distributed by the Morse Chain Co., Industrial Sales Div., Ithaca, N. Y. The Morflex principle, employing preloaded rubber biscuits as the flexible medium, is explained and illustrated. Torsional deflection charts and instructions for use explain the method of coupling selection in controlling the torsional vibration of a system.

**PLASTIC EQUIPMENT**—Haveg Industries, Inc., 900 Greenbank Rd., Wilmington 8, Del., is distributing a 32-p catalog covering corrosion resistant plastic equipment. Included are pipes and fittings, valves, fume ducts and fume systems, tanks, towers, accessory supplies, heat exchangers and vacuum equipment. Haveg's newer products and materials—glass reinforced polyester, PVC (polyvinyl chloride), and Teflon equipment are also described.

**WATER DEMINERALIZATION**—A bulletin describing the electric membrane method of water demineralization is being distributed by Ionics, Inc., 152 6th St., Cambridge, Mass. It includes data on electric membrane plants ranging in capacity from 2,500 to 2 million gal of demineralized water daily, using input water containing from 1,000 to 10,000 parts per million of total dissolved solids.

**CORE DRILLER**—Bulletin 350, distributed by Sprague & Henwood, Scranton 2, Pa., covers the Model 30 core drilling machine. Portable, light, and compact the unit is manufactured with several type mountings, i.e. skid, trailer and truck. Specification charts, illustrations and tables accompany the text.



## **AERIAL VIEW OF GIANT DRAGLINE**

A low-flying plane provides this view of a Marion 7800 Walking Dragline at work in a southern Ohio coal stripping mine. The 7800 carries 35 yard buckets on 220-foot booms to meet a variety of special problems involving big yardage and long range.

**MARION POWER SHOVEL COMPANY, MARION, OHIO**

# NEWS ROUND-UP

## ACS Purchases Bull Line As Labor Trouble Looms

American Coal Shippings, Inc., purchased A. H. Bull & Co. (Bull Line) last month. The price was undisclosed, but informed sources in Washington estimated that ACS paid "about \$10 million." Comment around the capital said that the sum had been high enough to force ACS to turn to its members for additional funds—over and above the \$50 million ACS began with early this year. For its purchase price ACS got 15 vessels, all bulk cargo carriers comparable to the Liberty ships the company leased from the United States Maritime Commission this fall. One ACS official says about the Bull purchase: "It was made to give ACS a mantle of respectability." More, says this official, the purchase is expected to squelch rumors that ACS was a temporary whip that had been organized to force down ocean freight rates. In addition, the purchase is also expected to fortify the shipping group's position with the Maritime Commission on a proposed request for 50 more Liberty vessels, and to give ACS better profit-making opportunities, since Bull Line vessels will not be restricted on return cargoes and Liberty vessels are.

Meanwhile, ACS may be destined for trouble from another tack. Two AFL-CIO unions—the Masters, Mates & Pilots, and the Marine Engineers Beneficial Assn.—

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picketed the company's New York offices last month. The unions charged that ACS welched on "assurances" of contracts covering officers and engineers on ACS ships. They warned that picketing would be extended to the company's fleet as it goes into operation. They claim that ACS gave firm assurances that contracts would be worked out with the two unions to supply licensed officers and engineers if the Liberty leases were approved. But, since approval ACS has signed up with the National Maritime Union for unlicensed seamen, the American Radio Assn. for radio operators, and the small, independent Brotherhood of Marine Officers for personnel the MM&P and the MEBA seek to supply. The Brotherhood of Marine Officers is affiliated with the United Mine Workers Dis-

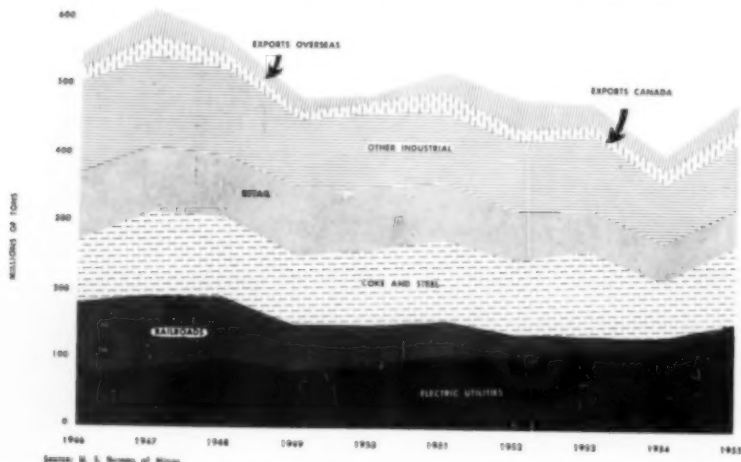
trict 50, a target of AFL-CIO opposition. Since the brotherhood is small and has contracts with only two major shippers (American Export and United Fruit), and since some estimates place coal export increases at 10,000 Liberty ship loads a year, a contract between the brotherhood and ACS could become a big plum. This prospect has added vigor to the MM&P and MEBA protests against ACS's recognition of the brotherhood. They charged that ACS had reneged on "assurances" of recognition after urging by John L. Lewis. They described the brotherhood as a "company union" because of its affiliation with the UMWA, part owner of ACS. Mr. Lewis and Thomas Kennedy, UMWA vice president, are directors of ACS.

As a result of the maritime unions' opposition AFL-CIO's president, George Meany, announced that the federation will try to get the Federal Maritime Board to reopen ASC charter authorizations. He criticized the recognition of the UMWA affiliate as "a clear violation of the basic principles of trade unions," and as "cut-throat competition." ACS, meanwhile, is saying nothing, only denying that it had been given the AFL-CIO unions' assurances of contracts.

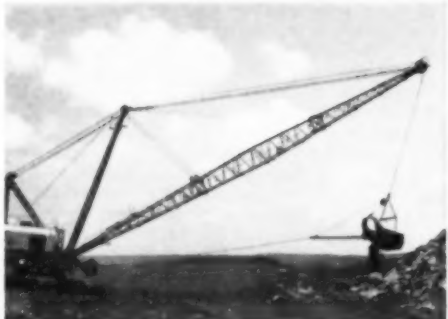
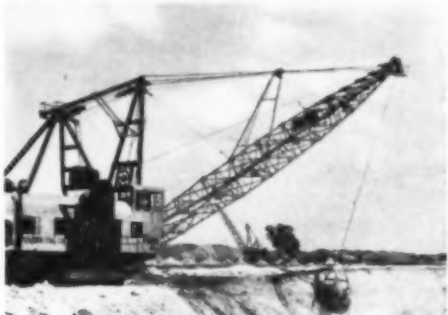
## Atom No Competitor Say AEC, USBM Experts

Coal producers can ignore the atom as a competitor until at least 1975, an Atomic Energy Commission expert and a government coal research expert have concluded. R. C. Dalzell, chief, Engineering Development Branch, Atomic Energy Commission, and Harry Perry, chief, Branch of Bituminous Coal Research, Div. of Bituminous Coal, U. S. Bureau of Mines, conclude that estimates, alone, of nuclear energy's impact are as much as 10 yr away. Meanwhile, the atom will displace only a small percentage of coal. The two men arrived at their conclusions in a paper, "Impact of Atomic Energy on Fossil Fuel," which was written for presentation at the ASME-AIME joint solid fuels conference in October. Mr. Dalzell and Mr. Perry point out that other fuel experts, such as Philip Sporn (American Gas & Electric Co.) estimate that the installed capacity of nuclear energy by 1975 should not be more than 20 million kw (other estimates range as high as 45 million kw). From this they deduce that 38 million tons of bituminous will be displaced, or only a small percentage of the 340-million to 488-million-ton expected requirements of the 1975 electric power load. Mr. Perry and Mr. Dalzell add: "Not only is the estimated nuclear energy

## Bituminous Coal Markets, 1946-1955



**A LOOK AT COAL'S MARKETS**—The changing markets of bituminous since World War II are charted by the National Coal Association as part of "Bituminous Coal Trends 1956," a 164-p book published by the NCA. In addition to sections on energy and markets, "Trends" has chapters on labor and research.



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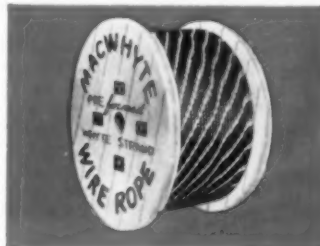
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## News Roundup (Continued)

displacement a very modest percentage of the anticipated total requirement, it is far less than the spread of these estimates. The forecasts for total United States coal requirements for all purposes, including export, range from 819 to 886 million tons." Thus, they concluded: "The obvious is that those who have to plan now for 1975 coal mining, handling, shipping etc., can ignore the impact of nuclear energy. It will probably be 10 yr before realistic estimates of this can be made, and by then it is quite possible that such nuclear energy applications as gasification of coal will be actually adding to the coal demand."

## Sporn Plant Chosen As Site Of 450,000-kw Steam Unit

American Gas & Electric Co. has selected Graham, W. Va., and its Philip Sporn power plant there as the site for the second of its two 450,000-kw electric power generating units. Like its AGE sister unit, now under construction on the Wabash River, Sullivan County, Ind., the Sporn unit will be 73% larger than any power producing unit operating today. Its utilization of nearly 3 million lb of steam each hour will consume 1.3 million tons of coal a year. Although AGE reports that it has completed bargaining for coal commitments, the company is not ready to disclose its coal suppliers. When completed, the steam unit will raise the Sporn plant's capability to 1,050,000 kw. Only the Clifty Creek plant at Madison, Ind., with its 1,290,000-kw will exceed the Sporn plant's capability. The Sporn unit and its sister unit on the Wabash represent the final 900,000 kw of new power production facilities in AGE's \$700 million, 5-yr expansion program. By the end of 1960 the power company's entire capacity will be almost 7 million kw.

## News Briefs

Coal production will reach 1 billion tons by 1975 as more and more energy is demanded by a population of 228 million, according to Dr. Clyde Williams, president of Battelle Memorial Institute, Columbus, Ohio. All fuel production will double, says Dr. Williams, and synthetic gas and liquid fuels will be made from coal.

Sycamore Coal Co. bought the Sterling Sewell Mine of the Mt. Hope Coal Co. at Holcomb, W. Va., last month. The mine's capacity is 1,200 tpd. Purchase price was undisclosed.

Island Creek Coal Co. and the West Kentucky Coal Co. are exploring the possibility of a merger. Thus far, the two companies reportedly are trading reports by their engineers and submitting tentative proposals.

The Lehigh Valley R.R. will spend a total of \$12 million to repair and rebuild freight cars. The program will include rebuilding 1,400 coal cars and 500 gondolas at the Lehigh Valley's own shop in Packerton, Pa. The railroad will spend at a rate of \$6 million a year for 2 yr.

United States Steel will begin constructing a new facility to produce "super refined" chemicals from the crude light oil derived from coal. The plant will be situated in Clairton, Pa., and will employ a process first developed in Germany. Manufactured products are to be benzene, toluene and xylene. They are expected to be virtually free of impurities. All three products are used in large quantities by the chemical industry and are used to manufacture insecticides, paints, dyes, detergents and synthetic fabrics.

As a deterrent to water pollution Pennsylvania's Sanitary Water Board has

### Bituminous Output

YEAR TO DATE	PRODUCTION
Nov. 17, 1956	442,426,000
Nov. 19, 1955	409,232,000

1956 output 8.1% ahead of 1955.

A month earlier output was 8.8% above 1955.

WEEK ENDING	PRODUCTION
No. 17, 1956	10,420,000
Nov. 19, 1955	10,486,000

### Anthracite Output

YEAR TO DATE	PRODUCTION
Nov. 17, 1956	25,194,000
Nov. 19, 1955	23,034,000

1956 output 9.4% ahead of 1955

A month earlier 1956 output was 8.5% ahead of 1955.

WEEK ENDING	PRODUCTION
Nov. 17, 1956	640,000
Nov. 19, 1955	609,000

adopted a regulation directing the disposition of acid-forming refuse from strip mines. The regulation: "In order to protect the clear water of the Commonwealth against acid pollution, all acid-forming refuse materials, including all rider, rooster, blossom, honey or other inferior coal or sulphur-bearing substances distributed during each cut of the operation, shall be separated from the rest and spread along the bottom of the pit close to the base of the spoil pile along the lowwall side of the cut. Promptly after being so placed, the acid-forming materials shall be covered with a sufficient amount of clean overburden. The top surface of the cover shall be so



**RECOGNITION** from the U. S. Bureau of Mines for 100% participation in the USBM's accident Prevention course by 394 men, at the (New River Co.) Summerlee mine, Mt. Hope, W. Va. Certificates were presented to management and local union officials. Men above are W. H. Tomlinson (left), training administrative officer, USBM; Vernon Cox, Summerlee mine superintendent; John Rosiek, vice president; Pleasant Penny, chairman of the safety committee, UMWA, Local 6048; Emory Calvert, general night foreman; and Lloyd G. Fitzgerald, USBM instructor.



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## News Roundup (Continued)

graded that water will run off rather than soak into the backfill to reach the acid-forming refuse under which it is buried."

Youngstown Sheet & Tube Co., Youngstown, Ohio, is preparing to construct a 76-oven by-products coke battery at its Campbell Works. The battery will be the third built in the Youngstown District in 3 yr. Youngstown says the new ovens are part of the company's \$250 million expansion program announced earlier this year. With a daily capacity of 1 250 tons of coke, the battery will have an annual capacity of 450,000 tons.

Three miners were killed and fourth critically injured in a mine explosion at the Truesdale Colliery of Glen Alden Corp., Nov. 7. The origin of the explosion was undetermined.

Wyodak Resources Development Corp., a subsidiary of Black Hills Power & Light Co., Rapid City, S. D., has exercised its option to purchase the Wyodak coal mine near Gillette, Wyo. The sales price is undisclosed. Harold E. Ross of Gillette will continue as vice president and general manager of the mine. Black Hills obtained its option to purchase two years ago when it bought Wyodak power plant and Kirk power plant near Lead, S. D., from Homestake Mining Co., parent of Wyodak.

A new award aimed at recognition of research potential and accomplishment by young engineering research workers in colleges and universities has been announced by the Engineering College Research Council of the American Society for Engineering Education. The Curtis W. McGraw Research Award, which will be presented for the first time in June, 1957, is sponsored by the McGraw-Hill Book Co. and includes a cash prize of \$1,000. Candidates are to be young men "who have made original contribution in engineering research and who have demonstrated high potential for future leadership." The recipient of the McGraw award will be selected each year by a special committee of the Engineering College Research Council; Dean James R. Cudworth, University of Alabama, is this year's selection committee chairman. Nominations should reach Dean Cudworth by Feb. 1, 1957. The first presentation will be made at Cornell University, Ithaca, N. Y., during the annual meeting of the American Society for Engineering Education, June 17 to 21.

Zeigler Coal & Coke Co., Chicago, is purchasing the Bradbury mine in Sparta, Ill. Under terms of a contract all mine properties will be acquired by the Zeigler company on Jan. 2, 1957. Present production is about 800,000 tons per yr.

The deaths of three miners by asphyxiation at the No. 1 mine, Slab Fork Coal Co., W. Va., in October probably were the results of the men's failure to

### Current Coal Patents

**No. 2,765,122**  
**JET MILL**, C. M. Trost, Oct. 2, 1956—In a compact fluid jet mill especially adaptable to the grinding of coal on board a railway locomotive, the material can be comminuted with a high degree of accuracy and high capacity. The device is so designed as to prevent high back pressures from seriously affecting either the capacity of the mill or its classification efficiency. The apparatus has no moving parts and can be readily modified to utilize either anvil grinding or jet grinding.

**No. 2,765,894**  
**HANDLING OF FINE, WET MATERIAL**, O. Craig (assigned to Riley Stoker Corp., Worcester, Mass.), Oct. 9, 1956—An apparatus for accomplishing gravity transfer of wet, finely ground material through a conduit, such as moving wet coal from a bunker to a crusher or pulverizer, without the usual difficulties due to packing and sticking. Instead of rapping or vibrating the conduit, a longitudinal movement is imparted thereto, causing a shearing action in the material so that it passes readily through the chute.

**No. 2,766,977**  
**ROTARY CUTTING HEAD FOR BORING TYPE CONTINUOUS MINING MACHINE**, J. S. Robbins (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 16, 1956—An improved roller type core breaking device for use with a boring machine of the type used for driving tunnels in coal. Cores can be broken easily and continuously, thereby accelerating the rate of advance of the boring machine.

**No. 2,767,806**  
**WET DUST SEPARATOR**, R. L. Blake, Oct. 23, 1956—Design for an improved wet dust separator for the removal of particles of coal from an air stream discharged from a coal preparation plant. The major portion of the wetted dust is removed from the stream of air immediately following the scrubbing action of the liquid, that is, at most effective wetting.

**No. 2,767,969**  
**MINING MACHINE FOR PLANING COAL FROM AN UNDERCUT**

**FACE**, F. B. Miller and M. W. Miller, Oct. 23, 1956—Design for a tool for penetrating and dislodging that portion of coal not provided with a bottom open side short of the end of the full stroke of the tool. This tool is used with a coal mining machine of the type disclosed in U. S. 2,721,066.

**No. 2,767,970**  
**REVERSIBLE LONGWALL MINING MACHINES**, T. C. Paul (assigned to The Mining Engineering Co., Ltd., Worcester, England), Oct. 23, 1956—This machine for mining coal by the longwall system is so designed as to operate in either direction along a give face without being at least partially dismantled when being reversed, and it is readily adjustable to the floor horizon being cut.

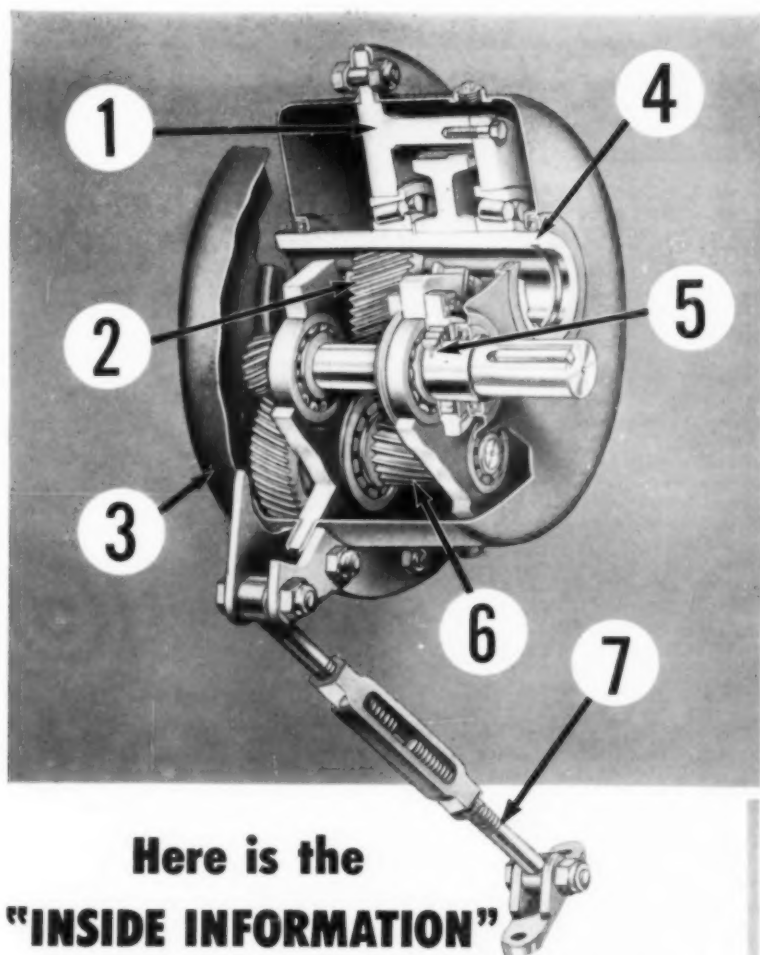
**No. 2,768,728**  
**CUTTING GATHERING DEVICE FOR A CONTINUOUS MINING MACHINE**, S. Bowman, (assigned to Westinghouse Air Brake Co.), Oct. 30, 1956—In a continuous coal mining machine of the multiple rotor type, an improved device is provided for raking the cuttings within the full length of the cut, and it can be expanded and retracted without affecting its operation.

**No. 2,768,820**  
**DISLODGING AND DISINTEGRATING MECHANISM FOR MINING APPARATUS**, J. D. Russell (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Oct. 30, 1956—The dislodging and disintegrating devices on a coal mining machine of the continuous type are arranged so that the coal intermediate the parallel cutter chain slots is dislodged in relatively large lumps, instead of the less valuable fines usually so produced.

**No. 2,768,943**  
**FURNACE FOR CONTINUOUS DISTILLING BITUMINOUS COAL**, H. D. de Vries, Oct. 30, 1956—A furnace for distilling soft bituminous coals, such as asphaltites, comprises a pair of superposed tubular chambers, of which the lower acts as the furnace proper whereas the upper chamber serves as a gas collector and expansion chamber, in case the starter material swells excessively.

take proper precautions, a four-man inquiry board has concluded. Composed of state mines chief Julius C. Olzer; inspector Frank J. Furin, USBM; A. J. Walker, general manager of Slab Fork, and James Leebler Jr., UMW safety engineer for District 29, the board said the three men were overcome by the carbon dioxide and nitrogen mixture known as black damp. The men were William

D. McPherson, 47, Midway, W. Va., general night foreman; Dewey Payne, 31, of Crab Orchard, W. Va., cutting machine operator; and Elmo T. Cox, 32, of MacArthur, W. Va., cutting machine helper. The board said: "Failure to take proper precautions on blasting a hole into abandoned workings where danger of black damp was known to exist, was the probable cause of the accident." The miners



## Here is the "INSIDE INFORMATION" on FALK <sup>ALL-STEEL</sup> Shaft Mounted Drives

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- 5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.
- 6 **Positive Lubrication**, continuous direct dip of revolving elements at all speeds.
- 7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

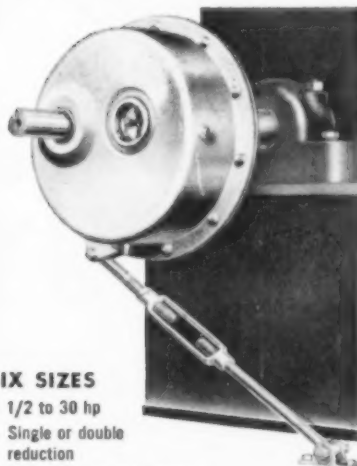
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### A FEW TYPICAL APPLICATIONS



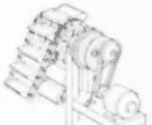
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LINE SHAFTING



SCREW CONVEYOR



BUCKET ELEVATOR



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## News Roundup (Continued)

perished when two of them, Payne and Cox, were found unconscious by McPherson during a routine check on a drainage way. Attempting to rescue the two men, McPherson, too, was overcome.

North American Coal Corp., Cleveland, Ohio, has established six scholarships in the Mining Engineering Div., College of Engineering at Ohio State. Students will receive a cost of living payment of \$100 per mo while enrolled at the school, and as freshmen will be provided fees and tuition. North American is also guaranteeing summer employment on North American's properties in Ohio, Pennsylvania and West Virginia. J. Richard Lucas, head of the Mining Engineering Div., declares that "the situation from this type program will have a tremendous influence on increasing the enrollment in mining engineering, which has always been considerably lower than in many other engineering fields." At Ohio State, Mr. Lucas said, mining engineering enrollment has increased 150% since an awards program "has been in effect."

An intensive campaign to boost the supply of hopper cars has been launched by the Baltimore & Ohio Railroad. B&O president, Howard E. Simpson, says that the campaign includes rebuilding 1,000 hoppers at a cost of \$5 million. The rebuilt cars, he said, began coming out of

### MEETINGS

AIME, Annual Meeting, Feb. 25-27, Roosevelt and Jung Hotels, New Orleans, La.

the shops in October at a rate of 150 a month. Another phase of the campaign includes reconstruction of an additional 1,000 cars as soon as steel can be secured. Recently, the B&O announced that 150,000 carloads of coal originated at mines on the B&O during a ten-week period. During the same period last year, the B&O said, 128,000 cars were loaded.

One of the country's largest and most modern shopping centers, Hillside Center in Hillside, Ill., will use bituminous to heat and cool, says Carroll F. Hardy, managing director of the Bituminous Coal Institute. The 59-acre shopping site contains a total floor space of 426,000 sq ft, and accommodates 71 small stores and two major department stores. Bituminous, reports Mr. Hardy, won out after comparative studies were made of annual operating costs of all fuels. As a result the center will burn about 3,500 tons of bituminous annually in highly efficient automatic boiler room equipment.

Peabody Coal Co. is planning a multi-million dollar office building in Pittsburgh. Merle C. Kelce, executive vice president of Peabody, says the company

will spend this year and next, a substantial part of a 4-yr, system-wide capital outlay of \$38.6 million. Peabody's Pittsburgh office building will be a 2-story, black granite and aluminum structure and will be built in the city's downtown area. It will house the company's principal operating, engineering, purchasing and finance division and sales division. Site preparation has already begun. In addition to the office building, Peabody's expansion program includes a coal barge loading dock 2,500 ft long and 70 ft high with a loading capacity of 1,200 to 1,400 tph. Another phase of the spending program includes the purchase of the St. Louis and Bellville Electric Railway Co., an 18-mile line that connects the company's Bellville properties. Still another part of the program includes Peabody's strip and slope mines at Freeburg, Ill. (including operation of a 70 cu yd shovel).

Pittsburgh Consolidation Coal Co. has relinquished co-ownership of the Renton Coal Co., New Kensington, Pa. As a result National Steel Corp., Pitt Consol's partner in ownership, becomes sole owner. Renton produced 850,000 tons last year, employing some 335 men.

In an attempt to head off stream pollution in West Virginia's Guyandotte River basin, the state's water commission has cleared a plan to pump coal washery wastes into abandoned mines. The commission has concluded that the plan is safe and is legal. Both state and federal mine inspectors, however, have protested the practice of pumping waste into abandoned sections of active mines, especially when the abandoned areas are ventilated along with the active workings. But, after conferences in West Virginia's Beckley and Logan, the water commission reports that "initial response to the plan has been splendid." Voluntary moves by coal companies here to avoid polluted streams are part of an area wide campaign against all trash, garbage, and waste disposal that is polluting streams.

Alberta coal production is coming out of a 7 yr decline and several hundred miners could be placed immediately as a result of the fall step-up in output, according to W. C. Whittaker, manager director of the Coal Operators Assn. of Western Canada. Mr. Whittaker says that production in 1956 is expected to exceed the output of last year's 4,455,279 tons. Production has declined annually since a high of 8,616,855 tons in 1949. The latest production increase has started in earnest, he says, but is hampered by shortages of miners and rail cars. Mr. Whittaker predicts that production will remain steady for the next few years and begin to increase in five years as a result of increased demand anticipated by the industry in power and industrial consumption. About 12% of Alberta's power is generated from coal at this time. With the province's power needs increasing at the rate of 10% each year, demand for coal could soar to new levels despite competition of natural gas as fuel.

### Preparation Facilities

Imperial Coal Corp., Clymer, Pa.—Contract closed with Wilmot Engineering Co. for a preparation plant to handle 150 tph R-O-M. Equipment includes one Wilmot-OCC heavy media system to prepare 8x½ bituminous.

Fisher Associates, Schuylkill Haven, Pa.—Contract closed with Wilmot Engineering Co. for an anthracite coal preparation system for 150 tph of R-O-M feed. Equipment includes one Wilmot-OCC heavy media system to prepare egg, stove, nut, pea and buckwheat No. 1.

Newkirk Mining Co., Tamaqua, Pa.—Contract closed with Wilmot Engineering Co. for an anthracite coal preparation plant for 300 tph of R-O-M. Equipment includes one Wilmot-OCC heavy media system to prepare egg, stove, nut, pea and buckwheat No. 1; one 7-ft hydrotator for rice; one 7-ft hydrotator for barley; one 7-ft hydrotator for No. 4; and one 12-ft hydrotator-classifier for No. 5.

Pine Township Coal Co., Heilwood, Pa.—Contract closed with Wilmot Engineering Co. for bituminous preparation plant to prepare 175 tph of R-O-M feed. Equipment includes one Wilmot-OCC heavy media system to prepare 3x½; one 7-ft hydrotator for ¾x¼ mm; one centrifugal Reineveld dryer; one thermal Baughman dryer.

Glen Alden Corp., Audenried, Pa.—Contract closed with Wilmot Engineering Co. for an anthracite coal preparation plant for 300 tph of R-O-M feed. Equipment includes one Wilmot-OCC heavy media system to prepare egg, stove, nut, pea and buckwheat No. 1; one Wilmot-OCC heavy media system to prepare rice and barley sizes of anthracite; one 7-ft hydrotator to prepare No. 4 anthracite; and one 12-ft hydrotator-classifier to prepare No. 5 anthracite.

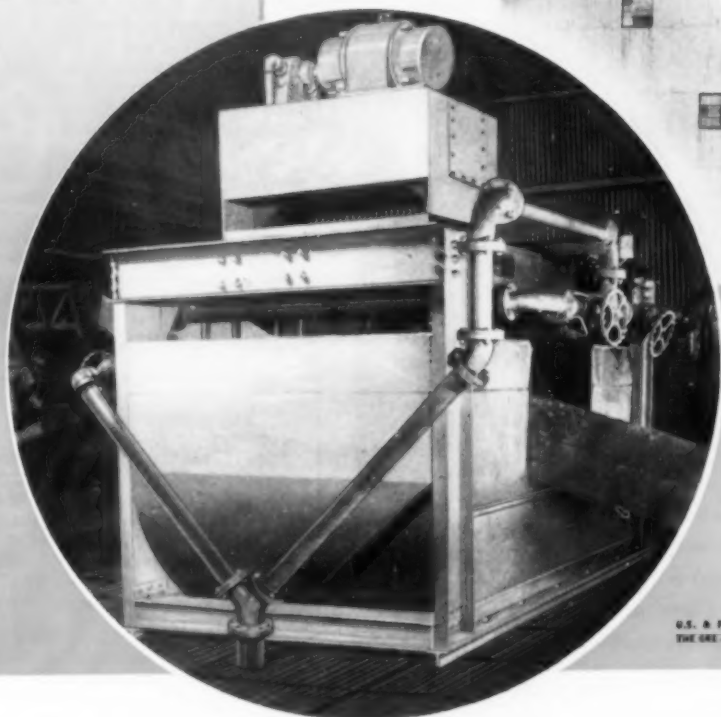
Black Star Coal Co., Morea, Pa.—Contract closed with Wilmot Engineering Co. for an anthracite coal preparation system for 500 tph of R-O-M. Equipment includes two Wilmot-OCC heavy media systems to prepare 4x½ R-O-M.

Amherst Coal Co., Amherstdale, W. Va.—Contract closed with Eimco Corp., for a coal filtration system. Filter size is 10 ft 6 in, Dx9 disc Agidisc, and is rated to handle 30 tph of solids consisting of 28Mx0. The filter will be fed from the underflow of 14-in Heyl & Patterson cyclones. Probable start-up date, March, 1957.

Big Run Coal & Clay Co., Princeton, Ky.—Contract closed with the Jeffrey Mfg. Co. for a unit washer consisting of a single-compartment diaphragm jig and sludge tank to handle 60 tph of 6-in raw coal.

# This Year-Old Plant Reports \*LAB-TYPE SEPARATION with...

\*At 1.80 sp. gr.  
Right, Blaschak Coal  
Co. plant; designed and  
equipped by Wilmot  
Engineering Co. Went  
into service Sept., 1955



## WILMOT-OCC HEAVY-MEDIA VESSEL

U.S. & FOREIGN PATENTS.  
THE ORE & CHEMICAL CORP.

*President Blaschak says:*

### Preparation Engineers for Nearly 50 Years

Plants built and/or  
equipped. Heavy-Media,  
Hydrotator, Classifier,  
Froth Flotation units.  
Pilot plant and lab for  
customers' testing use.

"...After a year of operation we are most  
satisfied with the performance of our new pre-  
paration plant, engineered by your Company.  
The Wilmot-OCC heavy-media vessel is doing a  
splendid job: We have consistently maintained  
high separating efficiency and produced  
high quality products. The vessel operated  
throughout the past season without main-  
tenance. Checks show loss of less than 1/3 lb  
of magnetite per ton of raw feed..."



# WILMOT ENGINEERING CO.

HUNTINGTON, W. VA.: PO Box 1831, Phone JACKSON 5-2571

WHITE HAVEN, PA.  
Exec. Offices:  
HAZLETON, PA.

# BELOW FREEZING?

■ Don't worry about coal freezing in cars when Bee-Zee Screens have a hand in dewatering. These custom-shaped, custom-built screens are engineered to keep efficiency high, moisture low. Btu's per ton goes up... product uniformity goes up... customer satisfaction goes up.

Bee-Zee Screens make you money.



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ENGINEERING COMPANY  
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Send for an "Education" in Mined, Stainless Steel Screens. Write, wire or phone Galesburg 4397 collect for the all-new Bixby-Zimmer catalog... news of screens that fit any screening equipment.

ROUND-ROD SCREEN  
long life  
accuracy

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tugged  
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TRI-ROD SCREEN  
knife-like  
accuracy

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prolonged  
accuracy

GRIZZLY-ROD WITH  
SKID ROD  
tuggeest accuracy

## News Roundup (Continued)

Suez and Middle East hostilities may postpone indefinitely any decision in the United States to curtail oil imports here. The pounding here by independent producers in the last year to curtail imports had resulted in a promise by the administration to make a decision Dec. 1. Earlier, its efforts had been confined to letters advising oil importers to voluntarily reduce the flow to this country. Now, there may be no need to make any decision at all. The administration may begin diverting supplies to oil-short Europe. Meanwhile, West Europeans are scrambling to make private deals here with oil men, despite high costs and delivery bottlenecks. Purchase of petroleum on East Gulf and West Coast ports soared late last month, and British oil companies have been sending their tankers to the United States since the Suez Canal was first blocked.

Coal Age's annual index of articles, editorials, news events and operating ideas that were published during 1956 begins on p 183 of this issue. Each year Coal Age publishes an annual index in December for convenient referral by subscribers and other readers to feature stories, comment, and news about coal.

## Earnings Reports

**Island Creek Coal Co.**—Consolidated net profit for 9 mos ending Sept. 30, 1956, \$5,726,072; equivalent to \$2.61 a share on 2,146,391 common shares. The amount is an increase of 49% over the same period in 1955 when net profit was \$3,851,941, or \$1.97 a share on 1,896,391 common shares.

**Ayrshire Collieries Corp.**—Net income for 9 mos ending Sept. 30, 1956, \$442,717, or 70¢ per common share, compared with a net income for the same period in 1955 of \$358,577, or 60¢ a common share.

**Lehigh Valley Coal Corp.**—Net income of \$336,579 for the 9 mos period ending Sept. 30, compared with a net income of \$184,567 for the same period last year.

**Pittsburgh Consolidation Coal Co.**—Net income for the 9 mos ending Sept. 30, \$12,385,580, or \$1.90 a share, compared to \$7,707,690, or \$1.19 a share for the same period in 1955.

**West Kentucky Coal Co.**—Net income of \$1,131,753, after estimated taxes, for the 9 mos period ending Sept. 30, or \$1.32 a share on common stock, compared with a net income of \$406,184, or 47¢ a share for the same period last year.

**Independent Coal & Coke Co.**—Net income of \$122,702 for 9 mos ending Sept. 30, compared with \$265,082 for the same period last year.



HEADQUARTERS FOR  
BRODERICK & BASCOM  
**Yellow Strand**  
PREFORMED  
**WIRE  
ROPE**

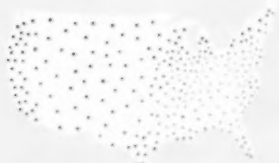
..the sign  
to follow!

*for longer wire rope life, and fast, nearby service*



One section of a typical distributor's ample stock of various sizes and types of Yellow Strand Wire Rope. This assures his customers of prompt, efficient service.

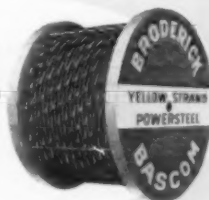
When you "follow the sign of Yellow Strand," you are sure of long life wire rope service and reduced wire rope costs. That's because Yellow Strand has in-built stamina for wear resistance under rugged duty. But, further, you get prompt delivery service from the on-hand stocks of a nation-wide network of Broderick & Bascom distributors, factory branches and warehouses. The B & B distributor organization is unique in the wire rope industry, with stores located conveniently everywhere in the U. S. A. They're also expertly equipped to assist you in specifying the correct wire rope for your equipment. Write us today for the name of your Yellow Strand distributor.



Yellow Strand distributors, factories and warehouses are located conveniently near you for immediate service.

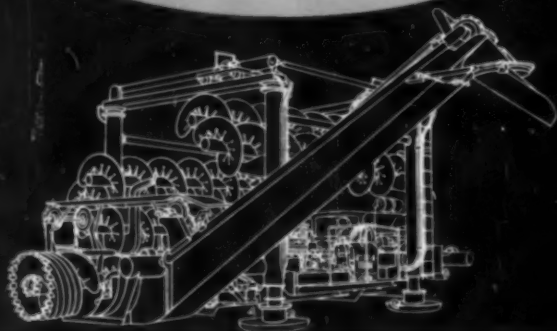
**Yellow Strand**  
Manufacturers of Wire Rope for over 80 Years

**BRODERICK & BASCOM ROPE CO.**  
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## Better RECOVERY with the Better AUGER

**COMPTON COAL  
AUGER INCREASES  
RECOVERY from  
35% to 65%**



● On operation after operation the Compton Coal Auger has shown its ability to increase coal recovery from 35% to 65%. In planned mining where all types of mining, auger, strip and deep, are used the Compton Auger has added greatly to the profitable efficiency of the overall operation—recovering quickly and profitably tons of coal which would be impractical cost-wise to mine by any other method.

### Better RECOVERY with the Better AUGER:

● Compton's patented non-clogging lump recovery head, which has been copied but never duplicated, cuts coal at high speed giving maximum recovery in record time... under favorable conditions as much as 870 tons in a 7¼ hour shift with a 4 man crew.

### Better RECOVERY with the Better AUGER:

● Developed by the maker originally for his own use the Compton Auger is the successful result of much engineering research plus exhaustive field tests and actual on the job experience. Painstaking effort which reflects in the many Compton Augers now in use profitably recovering tons of coal for their satisfied owners.

● For the complete Compton Auger facts and their correct application to your property, call for a Compton sales engineer now. Learn about planned auger mining from the pioneers in this rapidly growing field of mining "lost" coal at a profit.

# Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

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CLARKSBURG, WEST VIRGINIA

## Association Activities

Finley H. Davis, Lexington, Ky., has been re-elected president of the Hazard Coal Operators Assn. Mr. Davis is president of the Midland Mining Co. Other officers: L. A. Hopper, vice president; Fred B. Bullard, executive treasurer; and Mrs. Geneva Mansfield, assistant secretary-treasurer. All are from Hazard. Elected as directors for a term of one year, in addition to Mr. Davis and Mr. Hopper, were: Bruce L. Davis, Lexington, Ky.; C. E. Fannin, Portsmouth, Ohio; R. H. Kelly, Bramwell, W. Va.; John Mayhew, Knoxville, Tenn.; F. M. Medaris, Harveysburg, Ky.; R. P. Price, Whitesburg, Ky.; and C. E. Walker, Tazewell, Va.

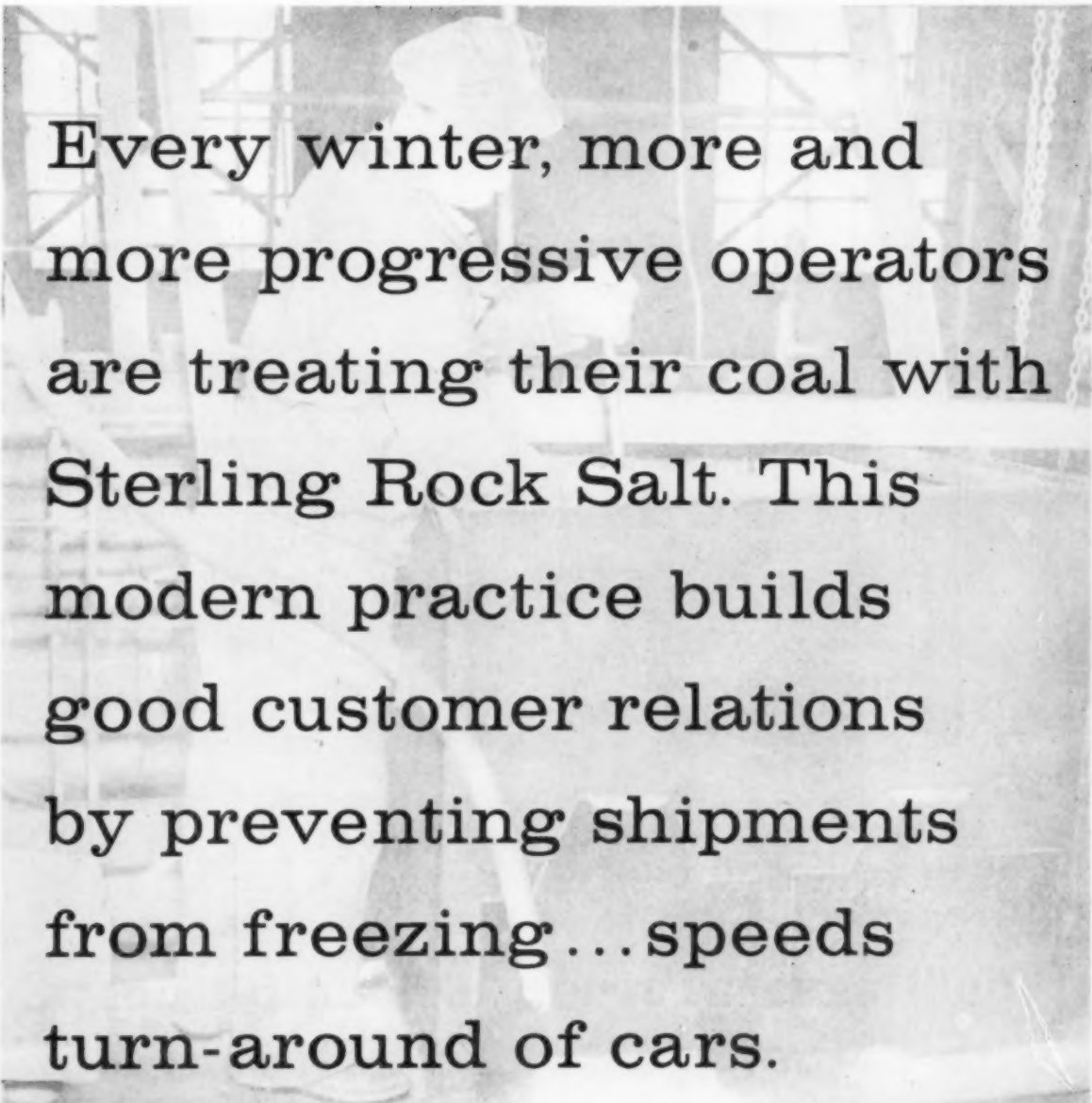
B. W. Whitfield III, vice president of Harland Collieries Coal Co., was elected president of the Harlan County Coal Operators Assn. Nov. 2 in Harlan, Ky. Joe Straas, vice president of the Kentucky Cardinal Coal Corp., Cardinal, Ky., was elected vice president; and George S. Ward was re-elected secretary.

J. S. Laird, vice president of the Gay Mining Co., Mt. Gay, W. Va., was elected president of the Operators Association of the Williamson Field during the 42nd annual meeting, Oct. 24, in Williamson, Ky. R. D. Jones, general superintendent, Kentland-Elkhorn Coal Co., Dulap, Ky., was elected vice president; L. E. Tierney, Jr., president of Eastern Coal Corp., Bluefield, W. Va., was re-elected treasurer; and Joseph J. Ardigo was elected executive secretary.

The Mineral Producers Association, Kittanning, Pa., and the Independent Coal Producers Association, Butler, Pa., merged October 1. The new organization is known as the Independent Mineral Producers Association. Its offices are in Butler. New officers are W. C. Altwater, president; Franklin H. Mohny, executive vice president; William Harger, vice president; James MacFarlane, secretary-treasurer.



**COAL MEN ON THE JOB . . .**  
SONMAN, PA., EASTERN GAS & FUEL ASSOCIATES—Ivan A. Given, (left), editor, *Coal Age*, and Joseph H. Stonebraker, general outside foreman.



Every winter, more and more progressive operators are treating their coal with Sterling Rock Salt. This modern practice builds good customer relations by preventing shipments from freezing...speeds turn-around of cars.



Here are some other important reasons why *you* should use economical Sterling Rock Salt this winter: Sterling Rock Salt is simple to apply, handles easily, is harmless to hands and clothing, stores without loss. And it dissolves slowly, to give long-lasting antifreeze action. You can also use Sterling Rock Salt to prevent frozen scales and switches . . . and to keep roads and yards clear throughout the winter. It removes snow and ice *fast*.

Order Sterling Rock Salt now—regular or “Inhibium Treated” to prevent corrosion of metal equipment. International’s strategically located mines are ready to give you fast shipments in bulk, or handy 100-lb. bags.

**INTERNATIONAL SALT COMPANY, INC., SCRANTON, PENNA.**

*Sales offices:* Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N.J.; Buffalo, N.Y.; New York, N.Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.



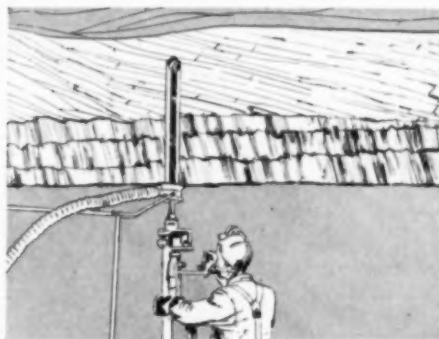
## START

... with a Carboloy APT bit. Save 10% on initial cost over solid-type roof-bolting bits — get faster penetration in soft-to-medium formations.



## FINISH

... with a Carboloy PTH bit. Utilize roof bits tipped with the hardest carbide ever used in the field, for your hard and abrasive formations.



If you're drilling through soft-to-medium formations . . .

## You'll save at least 10% on bit costs with Carboloy APT and PTH roof bits

Start with a Carboloy® APT roof-bolting bit, finish with a Carboloy PTH. You'll get faster cutting through soft formations, easier drilling in hard formations . . . while saving 10% on bit costs.

The Carboloy APT is specially designed as a starting bit. It costs less than solid-type bits, yet its extra-long carbide tips penetrate soft shale, head coal, and limestone faster. It eliminates rifled holes, and provides more clearance for initial insertion of the bolt.

The Carboloy PTH is designed to cut through more abrasive materials such as limestone, sandstone, and stratified formations. Tipped with the hardest, most wear-resistant carbide ever used

in the field, this high thrust bit will produce clean, straight, on-size holes, and maintain gauge.

Both the Carboloy APT and PTH are made for easier regrinding, and more regrinds per bit. Used as a team, these bits will bring substantial reductions in operating expense and maintenance costs.

You'll find large stocks of these roof-bolting bits — plus all the other tools in the complete Carboloy line — at your nearby Authorized Carboloy Mining Tool Distributor. Contact him today (his name is listed on the opposite page), or write: Metallurgical Products Department of General Electric Company, 11120 E. 8 Mile St., Detroit 32, Michigan.

# CARBOLLOY

CEMENTED CARBIDES

\*Carboloy is a trademark of the General Electric Company

## COAL MEN ON THE JOB . . .



MADISON, W. VA., HAMPTON MINES, WESTMORELAND COAL CO.—L. V. Sutphin (left), transitman; W. M. Hanlon, mining engineer; Emil Meadows, draftsman, and O. G. Malcomb, chairman.



BLACK STAR ANTHRACITE CO.—John Summers (left), superintendent; and Frank Leonard, office manager. Company is situated near Hazleton, Pa.



SAFETY COMMITTEE of Allied Chemical & Dye's Semet-Solvay Div. coal mines attended the National Safety Congress coal mining sessions in Chicago, Ill., Oct. 22-24. The delegates are Bracie Clark (1st row left), John L. Lewis, Joseph Mulligan, Floyd Booker; Charles D. Bowling (2nd row left), Clarence Jessee, Troy Jessee and H. C. Dykes.

## Carboloy Mining-Tool Distributors

Your local Carboloy Mining-Tool Distributor is listed below. His complete stocks guarantee you immediate local delivery.

### ALABAMA

Birmingham 2—Shook & Fletcher Supply Co.

### COLORADO

Denver 17—Mine & Smelter Supply Co.

### ILLINOIS

Mt. Vernon—Central Mine Supply Co.

### INDIANA

Terre Haute—The Mine Supply Co., Inc.

### KENTUCKY

Harlan—General Electric Supply Co., Div. of General Electric Distributing Corp.

Harlan—Kentucky Mine Supply Co., Inc.

Madisonville—Central Mine Supply Co.

Paintsville—Farmer's Supply Co.

Pikeville—Big Sandy Electric & Supply Co., Inc.

### NEW YORK

Buffalo 23—Austin Ford Logan, Inc.

### OHIO

Cambridge—Cambridge Machine & Supply  
Steubenville—Voto Manufacturers Sales Co., Inc.

### OREGON

Portland—J. E. Haseltine & Company

### PENNSYLVANIA

Johnstown—General Electric Supply Co., Div. of General Electric Distributing Corp.

Pittsburgh—General Electric Supply Co., Div. of General Electric Distributing Corp.

Washington—Fairmont Supply Co.

### TENNESSEE

Knoxville—Crowell Engineering & Sales Co.  
Knoxville—W. J. Savage Company

### TEXAS

El Paso—El Paso Saw & Belting Co.  
El Paso—Mine & Smelter Supply Co.

### UTAH

Salt Lake City 1—Mine & Smelter Supply Co.

### VIRGINIA

McClure—Erwin Supply & Hardware Co.

### WEST VIRGINIA

Bluefield—Bluefield Supply Co.  
Bluefield—Rish Equipment Company  
Charleston—Rish Equipment Company  
Clarksburg—Rish Equipment Company  
Fairmont—Fairmont Supply Company  
Montgomery—Marathon Coal Bit Co.  
Shinnston—Erwin Supply & Hardware Co.

**CARBOLLOY**  
CEMENTED CARBIDES



SPRINGHILL, N. S.—No. 4 Colliery, Dominion Steel & Coal Corp., Ltd., where 39 died.

## Foreign News

### CANADA

Flies buzzed lazily in the Indian summer air over the ancient coal-mining

town of Springhill, N. S., one day late in October. Two old men sat in the sun outside a general store and talked of going fishing. Suddenly blue flame as long as a car spat from the mouth of No. 4 colliery on the hill above town. The headframe heaved as an underground blast felt 30 mi away shook the hills

around. A giant ball of fire spewed from the stricken mine.

Then—shocked silence. In the next few seconds a feeling of utter grief and futility seized the hearts of the townsfolk. One hundred and thirty men were working in No. 4 when she blew.

The final outcome: 39 dead, 5 wounded. It was Canada's worst mining disaster since 1930 when 45 died at Blakeburn, B. C.

What caused the blast? Investigations were launched by at least three groups to find the answer. They included Dominion Steel and Coal Corp., owners of the mine; the Nova Scotia provincial government; and the department of mines of the Canadian government.

The results of the investigations will not be made public for some months, but it seems certain that no type of man-made explosive was a factor. One of these two explanations seems most likely: firedamp (methane) was somehow ignited or coal dust was set off.

Support for the firedamp explanation came from the fact that rescue workers found the upper part of the mine filled with afterdamp after the blast.

The coal dust explanation also seems remote in view of the statement of Lionel Forsyth, Dominion Steel and Coal president, that the mine was kept thoroughly rockdusted.

The blast blew one miner working on the surface into the air. He died instantly. Others working nearby were injured. The men of Springhill ran to the explosion site, only to be forced back by gas and smoke.

Finally two men wearing gas masks picked their way down the debris-littered slope. When only 130 ft down, they were overcome by fumes. They were dead when finally pulled back to the surface by fellow-rescuers.

Hero of the disaster was mine foreman Con Embree, who is credited with saving the lives of 51 of his men. Trapped underground, he told his men to cut holes in an air hose, plug their noses with cloth, and put their mouths to the openings. The group was later led to the surface.

Eighty-eight of the 130 trapped by the blast were finally rescued, most by way of a tunnel joining No. 4 with nearby No. 2 colliery. The last of the survivors was brought to the surface 3½ days after the blast.

Harold Gordon, the rescue director, then made the hardest decision of the entire rescue operation. He knew 26 men, some perhaps still alive, were still down below. But he announced that the mine would be sealed off until the danger of fire and explosion were over.

"The feeling of relatives must be indescribable," he said, "but we can't jeopardize the lives of other miners by bringing the dead out."

### HUNGARY

Ripped and torn by Russian armor, paralyzed by a general strike, Hungary faces a winter of privation unless it receives aid quickly. These are the grim results of a revolt smothered by Soviet



RESCUED—Charlie Burton, mine foreman, after rescue from No. 4 Colliery owned by Cumberland Coal Co., subsidiary of Dominion Steel & Coal Corp., Ltd.

# Here's **MORE** efficient driver speed for **HEAVY** **Loads**

## **ALLIS-CHALMERS** **TEFC Wound-Rotor** **MOTORS**

Where high inertia loads must be accelerated quickly and smoothly — yet power supply is limited — the Allis-Chalmers wound-rotor motor proves its efficiency . . .

High starting torque with this motor requires relatively low line-current. In addition, adjustable acceleration and running speed are possible through use of simple controls.

*Other features of the TEFC wound-rotor motor include:*

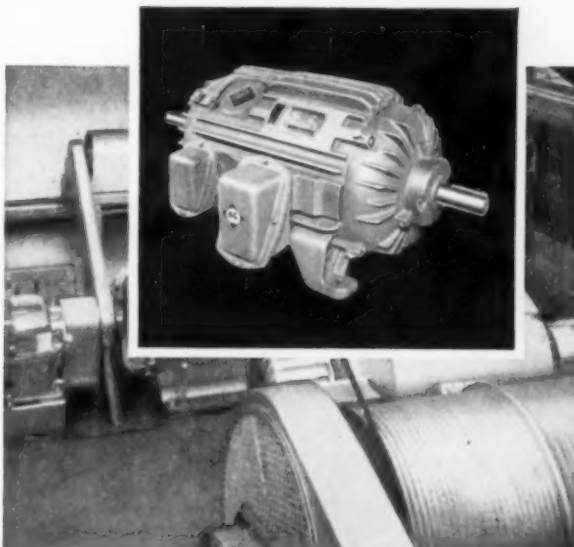
- 1. Rib construction** provides ample cooling surface.
- 2. Single enclosure** surrounds stator, rotor, slip rings, brushes and brush rigging. Gives maximum protection in moist, dirty, corrosive or hazardous atmosphere.
- 3. Cast-iron frame** contributes rigid, distortion-free bearing support and keeps alignment true.
- 4. Easy access** to collector rings and brushes permits on-the-spot inspection of brushes and commutators.

If you use hoists, lifts, cranes, conveyors, crushers or mills, find out more about the "MORE" in Allis-Chalmers wound-rotor motors. A-C motors also are available in various open types. Contact your nearby A-C sales office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

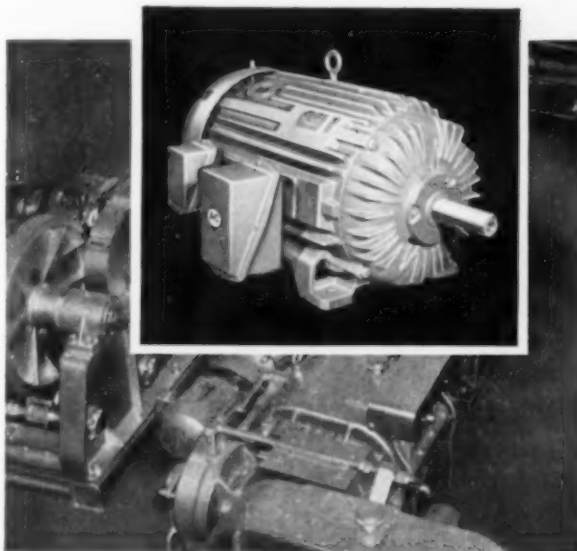


A-5180

# **ALLIS-CHALMERS**



**For intermittent duty**, this totally-enclosed, non-ventilated model is available in frame sizes 284 to 505 inclusive. Above 505 frame, Allis-Chalmers offers its famous tube-type motor.



**For continuous service**, this tough, fan-cooled model is ideal. All enclosed motors can be furnished in standard enclosed or explosion-proof construction rated 55 C rise.

# AKINS SEPARATOR

## makes 3-product separation in coal cleaning plant



This coal cleaning plant, as all prefabricated Sweco Heavy Media plants, is designed by the Southwestern Engineering Co. for the use of an Akins Heavy Media Separator, which is successfully making a 3-product separation with only one media cleaning circuit, using an Akins Heavy Media Densifier.

### PRODUCES 2 GRADES OF COAL

This Akins Separator is making a 3-product separation, requiring only one media circuit. The Akins Separator, permitting extraction and blending of middlings with either float or sink, makes it possible to improve both grade and recovery and produce two types of coal from the same seam... one a high grade for domestic and industrial uses and one a high-ash product for large steam plants.

### PROVED ADVANTAGES OF AKINS SEPARATORS

- 3-product separation in one machine, requiring only one media circuit
- Start-up under full load
- Entire vessel is visible and accessible
- Variation in rate or grade of feed is not detrimental
- Large pool area and volume minimize tramp refuse in the product and facilitate better recovery of values from fine sizes
- Gradation of gravity and viscosity from feed entry point to sink removal point provides natural cleaning of sink, and allows circulation of media at lower gravity and viscosity.

### WRITE FOR NEW AKINS SEPARATOR MANUAL 56

*Akins—the ORIGINAL spiral type classifier.*

## COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

*Sales Agents and Licensed Manufacturers in Foreign Countries*

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

### Foreign News (Continued)

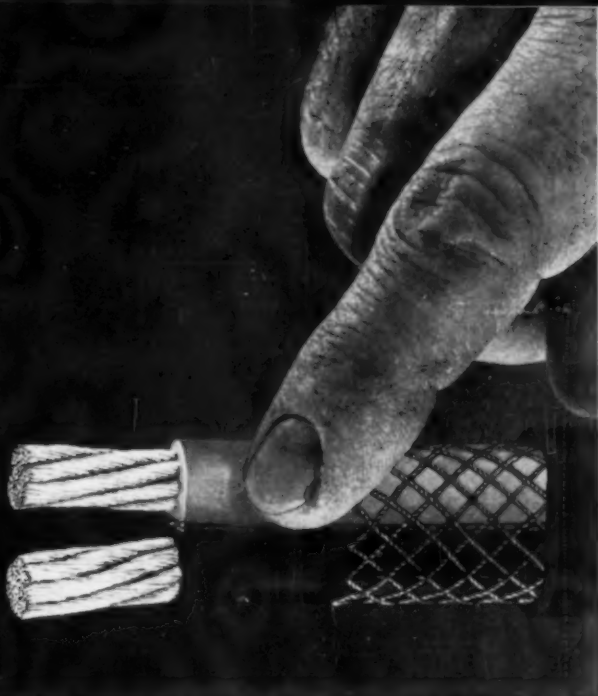
might. But, Hungary, before its ill-fated revolt, already had been facing a winter in which only shortages, especially in fuel energy, could be expected. The shortages, the experts said, were destined to be the greatest since the close of World War II. The responsibility, in part, lay with reduced output in coal mines and oilfields—which accounted for 92.8% of the total Hungarian primary energy sources in 1954—together with a period of highest primary energy demands that were already squeezing the Hungarian economy as early as mid-year, 1956. This year, in coal for example, 23 million metric tons had been demanded under the government's coal production plan. Soviet-originated methods for speedier mining were moved in and succeeded in raising output—but at the cost of quality. Simultaneously, oil production was breaking down and in July, 1956, economic chief Ernoe Geroe said that because of reduced oil output, Hungarian miners would have to produce 320,000 metric tons in excess of the production plan during the second half of 1956. Then in September, 600 trains per day were taken out of schedules. Later in the month, Sept. 30, Sunday, was declared a workday for miners and the Hungarian coal industry received orders to produce 600,000 metric tons of coal above original production schedules for the second half of 1956. Again, this was to make up losses in coal and to replace oil in certain industrial enterprises. Meanwhile, promises of help appeared from Poland, Czechoslovakia and Russia. But, a constant shortage of rolling stock, an aversion to river transportation because it is slow, negated these promises.

Now, no matter what occurs politically in Hungary, the forthcoming winter period's bitter weather, which usually reduces oil and coal output, will again reduce production drastically, even if the Hungarians call off their general strike, accept Soviet authority, and return to work.

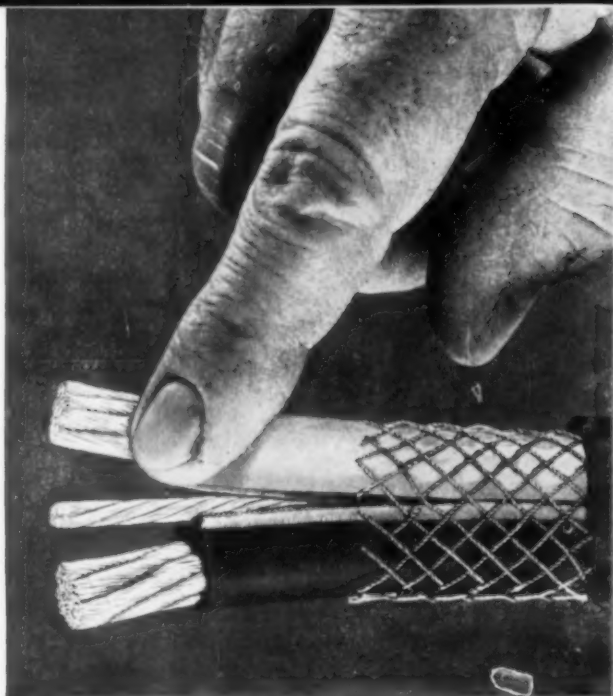
### GREAT BRITAIN

Construction contracts for an atomic power station in Ayrshire, Scotland at a cost of more than \$84 million are expected to be let by January. The new station's design calls for two nuclear power reactors capable of providing sufficient heat to generate 250,000 to 300,000 kw. Calder Hall (*Coal Age*, November, 1956, p 148). Britain's first nuclear power plant, generates 92,000 kw. This, however, is to be doubled within the next two years. Half the new station is expected to be operating by 1961, the second by 1962.

In London, Sir John Cockcroft, director of the Atomic Energy Research Establishment at Harwell has declared that the whole of western Europe will not have a nuclear power output equal to that in Britain by 1965. He also discounted American experimental and development programs as being a large part in the American economy during the next 10 to 15 yr. (Continued)



**1** New neoprene insulation compound gives Securityflex cable physical toughness on the INSIDE as well as the outside... resistance to puncture, flame and crushing.



**2** New flat stranding of grounding conductor prevents broken wires — thus assuring continuity of operation. Full 50% wire gives peak electrical protection.

## 2-YEAR STUDY GIVES YOU A New Triple Protection shuttle car cable

Before designing the new Securityflex® cable, Anaconda engineers checked thousands of shuttle car cables of all makes to see why they failed.

They found the jacket often looked fine, but constant bending, flexing or excess tension had broken insulation or snapped conductors. To combat cable "heart failure"—Anaconda's new Securityflex cable provides *triple protection inside* to match tough outer strength.

### 3 New Advantages

1. Rugged high-grade neoprene insulation greatly increases resistance to puncture, flame and crushing.
2. Improved stranding of ground and power conductors prevents broken wires—assures continuity of ground.
3. Nylon breaker strip increases short circuit protection. Nylon jacket reinforcement also adds to cable strength and prevents wicking of moisture.

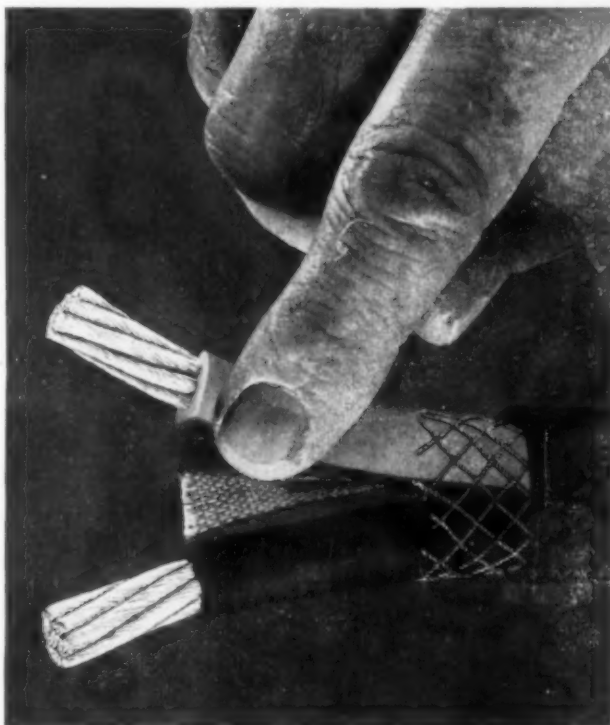
### Full 50% Grounding Wire

In addition—full, 50% grounding wire insures greater electrical protection, longer life, and extra safeguard against excess tension. Anaconda's flat, service-proven grounding wire allows more cable on reel—will not cut insulation if cable is crushed by runovers. Millions of feet of new Securityflex have been sold without a reported failure of grounding conductor. Insist on full-size grounding conductor for safety.

Ask the Man from Anaconda or your distributor for details. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

\*Reg. U. S. Pat. Off.

56348

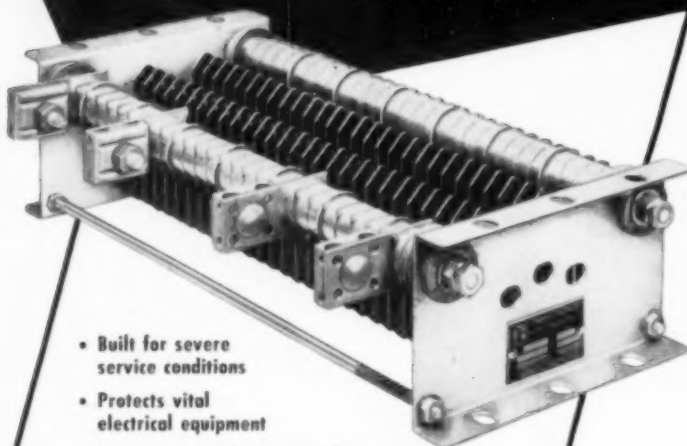


**3.** New nylon Anti-Short Breaker Strip® gives Securityflex amazing crush resistance... minimizes short circuits between conductors even under heavy impact.

ASK YOUR **ANACONDA®** DISTRIBUTOR  
FOR MINE CABLE



## Steel Grid Resistor plays an essential part in the production of COAL . . .



- Built for severe service conditions
- Protects vital electrical equipment
- Constant "trouble free" performance

These rugged nonbreakable units have proved their merit in all kinds of service for many years. Made of steel and mica, plus P-G unique and exclusive grid design, P-G Resistors are capable of protecting your most vital electrical equipment, even where service requirements are severe.

*Designed to fit  
your present  
resistor space*



## AUTOMATIC Transfer Switch



Single or double  
trolley and reel

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 to 600-volt service. Complete with cover.



**THE POST-GLOVER ELECTRIC COMPANY**

• ESTABLISHED 1897 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

## Foreign News (Continued)

Meanwhile, J. A. Jukes, economic adviser to the United Kingdom Atomic Energy Authority, has estimated that nuclear power stations might save the British up to 70 million tons of coal annually by 1975. By 1965, according to Mr. Jukes, Britain would be saving 5 million to 6 million tons of coal each year. On another front in Britain's assault on energy shortage, James Bowman, chairman of the National Coal Board, has attacked miners' too-frequent willingness to strike. The number of disputes in the first 37 weeks of this year has alarmed Mr. Bowman, who reports that 2,880 separate disputes arose from January to September 15. The chairman said the large number of disputes is not only cause for serious regret, but also for serious alarm. He called for an "end to this kind of conduct."

## ITALY

The latest figures available from Rome show that Italy imported 5.25 million tons of coal during the first half of 1956. Compared with the corresponding period in 1955, the rate of imports rose 158,000 tons, mainly because of increased shipments from the United States. Meanwhile, European countries have been selling Italy less and less.

## AUSTRALIA

Australia's Joint Coal Board is preparing to discuss with some of Australia's largest business undertakings a project for a coal utilization plant that would cost between \$110 and \$150 million. The project's construction would be based on a report prepared by the staff of the School of Chemical Engineering at the New South Wales University of Technology. A three-stage plan is provided for:

- A low-temperature carbonization plant using crushed coal to produce char, gas light oil and tar.
- A plant to produce acetylene, methanol, ammonia, synthetic rubber and nitric acid.
- Production of plastics and synthetic fibers.

## FRANCE

A sharp cut in French coal imports of at least 4 million tons is being forecast for 1957 by French coal traders. The cuts will be mainly in coal originating in the United States and Poland. Tonnage-wise, imports are expected to decline from about 18 million tons this year to an estimated 13 to 14 million tons. In contrast, imports of British coal—cut from 950,000 tons in 1955 to 724,000 this year—are likely to be larger. British coal is considered attractive for household purposes, for which the supply is tight. French exports are expected to be fractionally lower—about 2.4 million tons of coal in 1957 against 2.6 million this year.



JIM: "Not interested . . . been using the same flocculant for 19 years!"



PHIL: "I'm always looking for something better, let's give it a try!"\*

## Which is your reaction to the revolutionary flocculant, SEPARAN 2610?

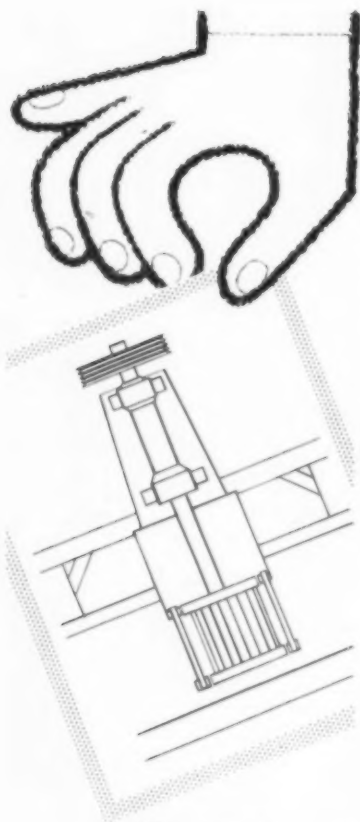
Oftentimes the solution to a problem is right at hand . . . if we are willing to accept change.

Jim, for instance, was having trouble with stream pollution and high maintenance costs. His coal washer was overloading the thickener. Overflow solids were too high for efficient washing. "I don't care how good Separan 2610® is," he said, when told about this new high-speed Dow flocculant. "I've been using the same flocculant for 19 years and don't intend to change."

Phil, on the other hand, had the same settling and filtration problems as Jim, but waving tradition aside replied, "Let's give Separan 2610 a try!" With only 0.06 pound per ton of fines, Phil cut clarification time from two *hours* to seven *minutes*! Water was conserved! Recycling, clay staining and stream pollution were reduced drastically!

\*A sample of Separan 2610 and technical assistance is available by writing THE DOW CHEMICAL COMPANY, Dept. SC 931E-2, Midland, Michigan

*you can depend on* **DOW CHEMICALS**



*selected*

WEMCO

### FAGERGREN FLOTATION MACHINES

are chosen most often when competitive tests are run, because of **savings in manpower, floor space, reagents, horsepower as well as superiority in metallurgical results.**



650 Fifth St., San Francisco 7, Calif.

Offices and representatives in principal cities of the United States and Canada and in major countries throughout the world.

## Personal Notes

Robert H. Seese has been appointed head of operations at Windber, Pa., by The Berwind-White Coal Mining Co. Mr. Seese succeeds **John M. Kerr**, general manager, who died in October after an August heart attack. Mr. Seese, formerly assistant general manager, was appointed to the new post pending appointment of a new general manager. Before joining Berwind-White he had been assistant to the owner of the Beechnut Coal Co.

**Walker Kennedy**, Los Angeles official of United States Steel Corp., has been named president at Salt Lake City of Liberty Fuel Co., with mines at Lutuda, Carbon County, Utah. Mr. Kennedy succeeds **L. Ross Weber**, chairman and president, who will continue as chairman. The new head of Liberty Fuel is a graduate of the University of Chicago. He started his business career with Columbia Steel Co., Ironton, Utah, in 1925.

**Don Dowlin**, Buckeye Coal Co. chief engineer, Nemacolin, Pa., has accepted a job with Allen & Garcia, Chicago.

**C. J. Lindstrom** has been appointed chief engineer of the Buckeye Coal Co. mine in Nemacolin, Pa. The promotion moves Mr. Lindstrom out of the foreman's job he has held at Buckeye's Mercer County strip mine near Mercer, Pa. A native of Winchester, N. H., he holds a BS degree in mining engineering from the Montana School of Mines, an MS degree in mining engineering from Penn State College.

**John G. Connell**, Connell Coal Co., Hazleton, Pa., has been appointed a member of Pennsylvania's Coal Research Board, succeeding Edward G. Fox.

Bituminous Coal Research, Inc., has announced the promotion of **Dr. Richard A. Glenn** from research chemist to supervising chemist. The appointment is the result of BCR's growth and the conse-



Dr. R. A. Glenn

quent need for supervisory personnel. Dr. Glenn's experience includes research in nitrogen bases from petroleum for the Union Oil Co. of California, research on the isolation and utilization of nitrogen bases from coal tar for Pittsburgh Coke & Chemical Co.

### Obituaries

**John M. Kerr**, 66, general manager of the Berwind-White Coal Mining Co., Windber, Pa., died Oct. 24. Mr. Kerr entered Windber Hospital Aug. 7 after a heart attack. He joined Berwind-White in 1927 after working in various coal installations in West Virginia. In 1955, Pope Pius XII bestowed upon him the order of the Knight of St. Gregory, one of the highest laymen honors in the Catholic church. Active for many years in the Central Pennsylvania Coal Producers Assn., Mr. Kerr was a member of the Board of Directors and the Wage Scale Committee.

**Ralph R. Adams**, vice president of the Sterling Coal Co., died at his home in New York City Oct. 23.

*Treat your coal and your customers with*

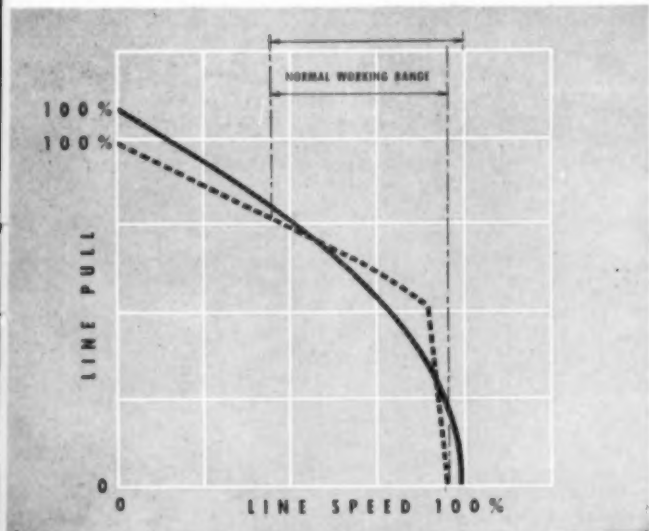
## SOUTHERN HOSPITALITY

Use "Southland Coal Spray" the amazingly *better* naphthenic oil with cold weather characteristics giving *better* freeze protection, and more dustproofing in winter.

## THE SOUTHLAND COMPANY

YAZOO CITY, MISSISSIPPI • Telephone 1212

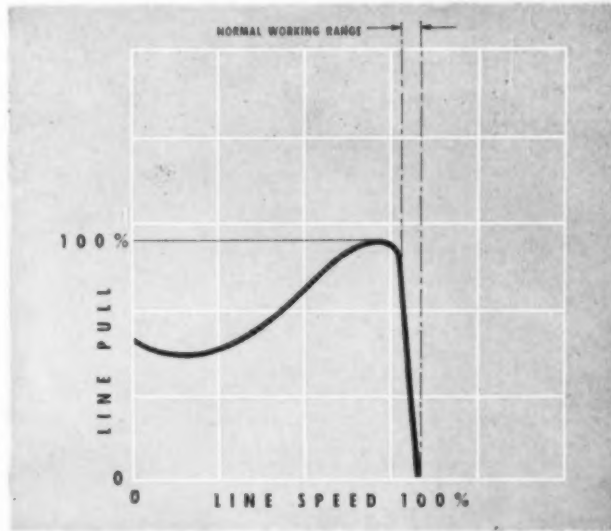
# LIMA teams A.C. electric motor with torque converter for power-on-demand through wide operating range



Power Performance of LIMA'S New Optional Unit:

A.C. Electric motor with torque converter drive. [Diesel-torque converter curve (dotted line) shown for comparison.]

With this drive, even under extreme loading, the motor will pull down in speed only a very small amount. It can never be stalled. The line pull will constantly increase through a long pull down speed range, depending upon the load applied.



Power Performance of A.C. Electric Motor with Direct Drive:

The motor speed and torque vary as shown for line speed and pull

With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.

## Lower First Cost — Reduced Maintenance

Now another quality-extra is available on all Lima machines. It's Lima's new electric power unit designed to give you full power-on-demand through a wide operating range.

Combining a single A.C. motor with a single stage torque converter, this drive matches, *electrically*, diesel-torque converter performance. It powers all motions and permits application of full power to any one motion as required. Under extreme loading, required power output is supplied at constant motor speed . . . and the motor can't stall or burn out.

The simplified electrical setup—with single A.C. motor

and no complicated electrical controls—means lower first cost. Electrical maintenance is reduced to a minimum, and servicing does not require highly trained personnel.

Just check the performance curves above. You'll quickly see that Lima's quality-built electric power unit provides the ideal answer for *your* jobs calling for electrically powered machines. You'll get maximum power performance under all operating conditions. Get full details now from your nearby Lima distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Baldwin-Lima-Hamilton Corporation Construction Equipment Division also manufactures Austin-Western Crushing, Washing and Screening Plants at its Lima, Ohio plant . . . and Madsen Asphalt Mixing Plants and equipment at its La Mirada, California, plant.

### CAPACITIES

Shovels ½ yd. to 6 yds. Cranes to 110 tons. Draglines variable. Smaller capacities available on rubber.



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**BALDWIN-LIMA-HAMILTON**  
Construction Equipment Division — Lima Works

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

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2½-ton GMC &  
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- From Government Storage!
- Unused and Guaranteed!
- Factory New Condition!
- Reconditioned Trucks also Available!

Save up to \$3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than one new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write,  
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MILTON Y. TOOMBS, JR.  
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**MEMPHIS EQUIPMENT**  
CONSTRUCTION AND AUTOMOTIVE  
EQUIPMENT AND PARTS  
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PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. Write for Catalog Sheet.

**ARMSTRONG BRAY & CO.**  
5340 Northwest Highway, CHICAGO 30, U. S. A.

# Among the Manufacturers

A 12-million dollar drill manufacturing plant will be built near Richmond, Ind., by Bucyrus-Erie Co. The plant will rise on a 148-acre site three miles west of Richmond and will provide 300,000 sq ft of floor space to manufacture drilling machinery. The site fronts on U. S. highway 40 on the south and is served by the Pennsylvania R. R. Construction schedules call for completion in late 1957 or early 1958. The 76-year old company operates five plants in four United States cities; associate company is situated in Lincoln, England.

Eric C. Piper, engineer for Bird Machine Co., S. Walpole, Mass., has been appointed sales manager of centrifugal and filtration equipment. Mr. Piper developed the drive for the Bird continuous centrifugal filter and has worked on the development of the Bird-Humboldt screen type centrifugal dryer.

General Tire & Rubber Co. is planning a 2-yr., \$3.25 million construction program. The plan calls for erection of office and warehouse facilities in six of the 20 General Tire divisions, as well as a half-million dollar addition to the Brittain warehouse near headquarters in Akron, Ohio. The company recently finished spending \$500,000 furnishing 45,000 sq ft of warehouse space at its Philadelphia division. The newest expansions will take place in Detroit, Boston, Denver, Portland (Ore.) and Charlotte (N. C.). Generally, the buildings will be one-story, steel frame, brick construction.

The Electric Storage Battery Co. has purchased the Dibb Mfg. Co., a 30-yr-old metal stamping, forming and fabricating company in Robbinsdale, Pa. Electric Storage Battery, which makes Exide, Willard and Grant batteries, paid \$65,000 in cash for the Dibb land, buildings, equipment and inventory.

John R. Fuller has been appointed sales manager of the Pittsburgh district, Hewitt Rubber Div., Hewitt-Robins, Inc. Mr. Fuller was assistant district manager of United States Rubber Co.'s office in Houston, Tex., before joining Hewitt.

Canadian Clark, Ltd., after a formal opening late in October, began manufacturing "Michigan" tractor shovels and cranes. The plant is situated in St. Thomas, Ont.

Stephen C. Berube, former engineer of two coal companies, has been appointed manager of the central sales region of Le Roi Div., Westinghouse Air Brake Co. Mr. Berube joined Le Roi in 1953 as district representative in Virginia, West Virginia, Kentucky and Tennessee. Before joining Le Roi, he had been a division engineer for the Jewell Ridge Coal Corp., Tazewell, W. Va., and

industrial engineer for the Island Creek Coal Co., Holden, W. Va.

Link-Belt Co., Chicago, Ill., has acquired the Detroit Power Screwdriver Co., Detroit, Mich., in an exchange of 20,000 shares of Link-Belt common stock on a basis of 2½ Link-Belt shares for one share of Detroit Power Screwdriver. The Detroit company will be operated as a subsidiary producing highly specialized automated equipment.

Research-Cottrell, Inc., Bound Brook, N. J., has appointed John G. McDonnell a sales engineer with its Pittsburgh district office. Research-Cottrell, Inc., manufactures electrical precipitators and mechanical dust collectors. Before his new appointment Mr. McDonnell worked for the Weirton Steel Div., National Steel Corp., and for S. P. Kinney Engineers, Inc.

Cummins Engine Co., Columbus, Ind., is establishing a plant in Shotts, Lanarkshire, Scotland, to manufacture the Cummins line of diesels. The new plant will be a wholly owned subsidiary and will be named Cummins Engine Co., Ltd. Total investment is \$4 million. Production is expected to begin in 1957 with full operation scheduled in 2 yr.

Construction of a half-million dollar metallurgical research laboratory by Timken Roller Bearing Co., Canton, Ohio, is scheduled to begin in the spring of 1957. As part of Timken's Metallurgical Research Dept. in Canton, the new laboratory will provide facilities for 75 metallurgical scientists.

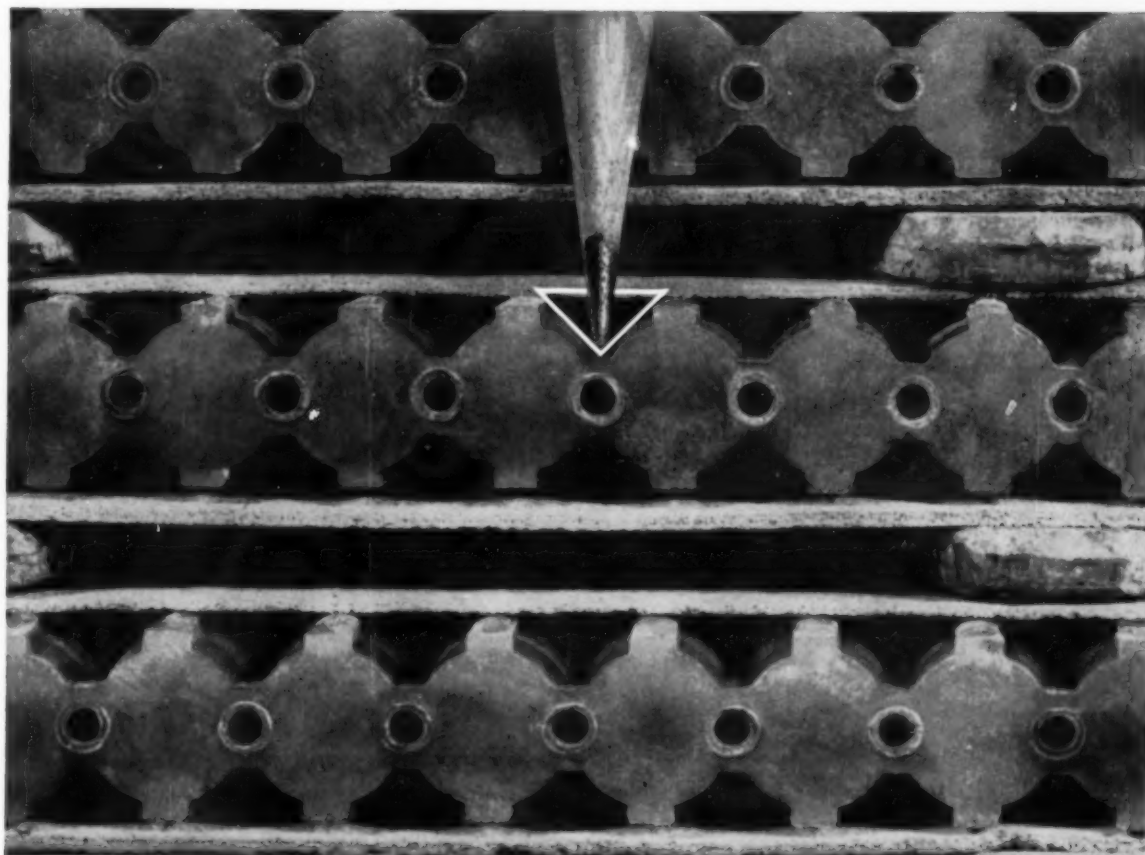
Dorr-Oliver, Inc., has formed Dorr-Oliver Pty, Ltd., wholly-owned subsidiary situated in Melbourne, Australia. Beginning Jan. 1, the new company will design, market and service D-O equipment for metallurgical, chemical and industrial use.

Koehring Co., Milwaukee, Wis., and the Buffalo-Springfield Roller Co., Springfield, Ohio, have merged. Both companies are construction machinery manufacturers. Koehring is the surviving corporation. The merger was accomplished through the exchange of an undisclosed amount of Koehring common and preferred stock for all the capital stock of the Buffalo-Springfield Roller Co. The acquisition is Koehring's sixth since World War II.

As a result of an expanding program in supplying parts Joy Mfg. Co. has appointed managers of new warehouses in Norton, Va., and in Meadowlands, Pa. James M. Blandin, critical materials supervisor at Franklin, Pa., since 1951, heads the Meadowlands warehouse. Paul T. Seyler, specifications engineer and

# EXIDE-IRONCLAD BATTERIES

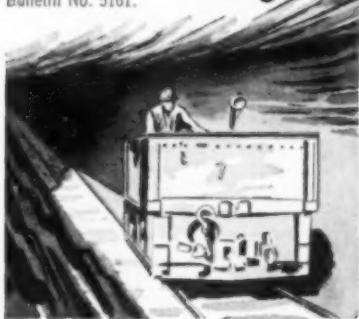
For all mining applications



**BOTTOM VIEW** shows tubular construction of positive plates in an Exide-Ironclad Battery.

## Pools of electrolyte next to plates speed heavy load response

**BATTERY FOR MINE LOCOMOTIVE.** Exide-Ironclad Model MVM. Write for copy of Bulletin No. 5161.



When the man at the control says "More power—fast," the positive plate in the storage battery says "More electrolyte—instantly." That's why the Exide-Ironclad Battery can meet heavy load demands so much more rapidly than other types of batteries. And it's the reason they outperform others in so many uses.

Adjacent to every positive plate in the Exide-Ironclad Battery are these triangular pools of electrolyte standing in reserve. When the call comes for power, the electrolyte is right there where it's needed for swift, sure response. There's nothing to slow down the action. Tiny slits in plastic power tubes let electrolyte in—yet prevent loss of active material.

Only the Exide-Ironclad Battery has this construction.

This exclusive feature is only one of the many reasons Exide-Ironclad Batteries have proved so superior in countless applications. When you order batteries for heavy duty service, or the equipment that requires such batteries, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

# Exide®

## TOP REQUISITE ...RUGGEDNESS!

COLLYER Mining Cables are constructed to meet the severest punishment that constant abrasion, flexing, impact, and crushing can inflict during shuttle car operation. Extra ruggedness is built into the dense, lead-cured Neoprene sheath which protects the rubber insulated, flexible conductors. Send for a recommendation on your cable requirements . . . standard or special . . . and learn why more and more colliers specify Collyers.



# Collyer

COLLYER INSULATED WIRE CO., 245 Roosevelt Avenue, Pawtucket, Rhode Island

### Manufacturers (Continued)

analyst at Franklin, heads the Norton warehouse operation.

The Construction Equipment Div., International Harvester Co., Chicago, has appointed Ralph C. Greer assistant sales manager. Mr. Greer succeeds C. E. Jones, who has advanced to supervisor of national contractors sales.

Quentin Cunningham, Pittsburgh, has been appointed sales representative in Pittsburgh by Dorr-Oliver, Inc., Stamford, Conn. Mr. Cunningham will market, stock and service the company's  
(Continued)

### EQUIPMENT APPROVALS

Eleven approvals of permissible equipment were issued by the U. S. Bureau of Mines during October.

Goodman Mfg. Co.—Type 2410 universal cutter; two motors, each 50 hp, 440 v, AC. Approval 2-1174A, Oct. 5.

Goodman Mfg. Co.—Type 584-20 shuttle car; three motors, two 15 hp and one 20 hp, 25 v, DC. Approval 2-1175, Oct. 10.

Ensign Electric & Mfg. Co.—Type KG distribution box; two circuit breakers, one 100 amp and one 225 amp, 230 or 550 v, DC. Approvals 2-1176 and 2-1176A, Oct. 10.

Goodman Mfg. Co.—Type 584-21 cable reel shuttle car; three motors, two 15 hp, one 20 hp, 250 v, DC. Approval 2-1177, Oct. 12.

Fairmont Machinery Co.—Model 55C shuttle car; one motor, 30 hp, 440 v, AC. Approval 2-1178A, Oct. 15.

Joy Mfg. Co.—Type WK82 Model 275T air compressor; one motor, 69 hp, 230 v, DC. Approval 2-1179, Oct. 22.

The Long Co.—Model D2347 pan transporter; one motor, 15 hp, 230 v, DC. Approval 2-1180, Oct. 26.

The Long Co.—Models D2332 and D2335 utility trucks; one motor, 4 hp or 5 hp, 230 v, DC. Approval 2-1181, Oct. 30.

The Long Co.—Models 626 and 640 elevating conveyors; one motor, 10 hp, 220 or 440 v, AC. Approvals 2-1182 and 2-1182A, Oct. 30.

Mine Safety Appliances Co.—Type SK-1686-2, two-wire, 130-v, AC, isolated mine light system. Approval 29-1, Oct. 30.

Mine Safety Appliances Co.—Type SK-1686-1, three-wire, 130-v, AC, grounded mine lighting system. Approval 29-2, Oct. 30.

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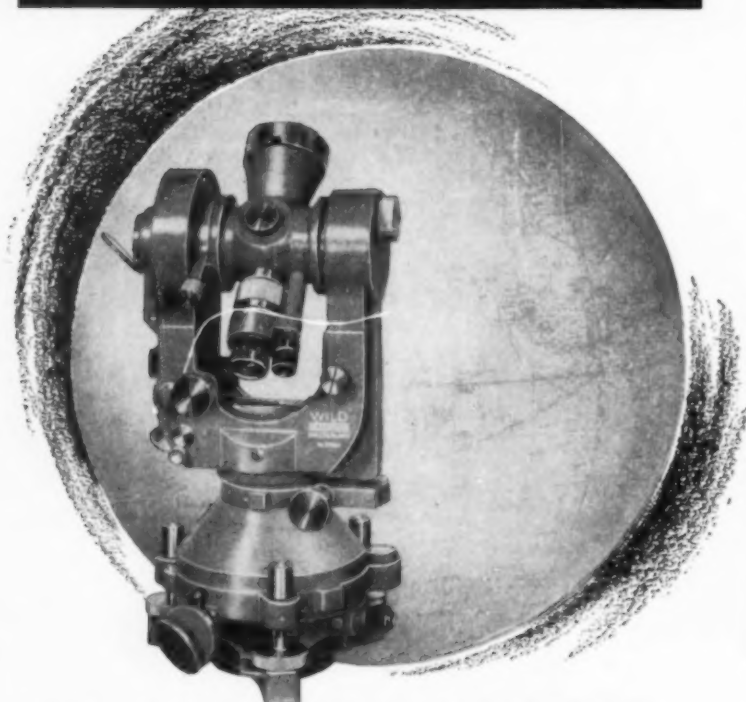
One of the finest recommendations for the Chance Process is our record of repeat orders from many of the biggest producers of the industry. Why not invite our engineers to study and discuss your requirements.

... Heavy, well-built equipment assures trouble-free performance

## 151

# WILD<sup>®</sup>

## HEERBRUGG



### WILD T-2 UNIVERSAL THEODOLITE

From any point of view...precision, speed, versatility and ease of operation ... here is the WILD instrument that has proved itself the world over, from jungle to ice cap!

Reading on both circles is direct to 1 second. Numerous convenient features include rapid optical plummet centering and large, fatigue-free field of view. Many accessories add to its inherently tremendous work potential.

WRITE FOR THE INTERESTING BOOKLET ON THE WILD T-2 ... and use the Wild Heerbrugg advisory services without obligation.

## WILD HEERBRUGG INSTRUMENTS, inc.

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SALES • FULL FACTORY SERVICES

### Manufacturers (Continued)

line of pumps and parts in West Virginia, western Pennsylvania, Maryland and Ohio.

Vickers, Inc., Detroit, Mich., has appointed Paul G. Sullivan an application engineer for the company's Pittsburgh district sales office. Mr. Sullivan will provide buyers with design, development and application engineering assistance throughout the Pittsburgh area.

C. A. Pickett, vice president and general manager of the Illinois Engineering Co., a subsidiary of American Air Filter Co., Louisville, Ky., has been named manager of American Air Filter's sales department, an organization within the company's Product & Marketing Div.

### Books For Coal Men

#### Ash Analyses

*Analyses of Ash From United States Coals*, by W. A. Selvig and F. H. Gibson. The report tabulates ash analyses of 323 samples of bituminous and sub-bituminous coal and lignite, and 13 samples of anthracite, identifying each by state, county, bed and mine of origin. It also gives proximate analyses, sulphur content and heating value for most of the coals. *USBM Bulletin 567*. 33 pp. 8x10-in.; paper; mimeo. 30¢. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

#### Power Distribution

*Electrical Power Distribution for Industrial Plants* is a completely revised edition of the original work published in 1945. Included are 10 chapters on system planning, voltage considerations, system protection, fault calculations, grounding, power factor, power equipment, instruments, conductors and terminators, and relative cost of industrial distribution systems. *AIEE No. 952*. 172 pp. \$3.50, 50% discount to AIEE members. AIEE, 33 W. 39th St., New York, N. Y.

#### Grounding

*Grounding of Industrial Power Systems* includes four chapters on system grounding, connections of frames, enclosures, etc., to grounding systems, the problem of static and the problem of obtaining low-resistance connections to the earth. *AIEE No. 953*. 40 pp. \$1.20, 50% discount to AIEE members. AIEE, 33 W. 39th St., New York, N. Y.

#### Timber Design

*Timber Design and Construction Handbook*, prepared by the Timber Engineering Co., is a comprehensive design reference and practical field handbook covering information needed to develop better, more economical wood structures. 622 pp. 6x9-in. \$12.75. F. W. Dodge Corp., 119 W. 40th St., New York 18, N. Y.

*Never-say-die dependability...*  
*proved on the Alcan Highway!*



*The Alcan test run was supervised and certified by the AAA.*

## NEW TASK-FORCE 57 CHEVROLET TRUCKS

Six new '57 Chevy trucks tamed the rugged Alcan in one round-the-clock sprint. They covered the grueling run (normally a 72-hour trip) in less than 45 hours to prove their durability!

They took everything the truck-killing Alcan could dish out—and not a single unit dropped out or turned back due to mechanical failure! They turned in top scores for performance and economy, too! Look over the Alcan Highway Champs at your Chevrolet dealer's. . . Chevrolet Division of General Motors, Detroit 2, Michigan.



### NO JOB TOO TOUGH FOR THE ALCAN CHAMPS!

You get Alcan-proved dependability in whatever medium- or heavy-duty model you choose. Put a new Chevy to work for you and take advantage of its extra stamina, its time- and money-saving ways!

PROVED ON THE ALCAN HIGHWAY... CHAMPS OF EVERY WEIGHT CLASS!

**CHEVROLET**

## THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

# What Can Be Done About It?

**T**here is no easy or quick way to overcome the shortage of scientists and engineers that has become a threat to our national security and economic progress. The solution can come only through diligent efforts extending over several years to bring the supply of technically trained people into balance with our needs. Meanwhile, the pressure of the shortage can be relieved if industry, government and education make better use of the limited number of scientists and engineers now available.

Earlier editorials in this series have discussed the dimensions of the shortage of technical manpower, its meaning for our national security and our economic well-being and the causes of the shortage. This final editorial will survey some of the measures that can be taken to overcome the shortage. Most of the proposals presented here have been suggested elsewhere. But in combination they appear to offer the best hope of an answer to this serious national problem.

### Soviet Methods Not For U. S.

It is clear that no crash program, inspired by panic and designed indiscriminately to drive hordes of high school students into science and engineering, is suitable for the United States. Even if we adopted Soviet methods of channeling a large portion of our brightest young people into technical fields, it would be at least four years before results appeared in the volume of college graduates. And such an approach would do no credit to the American way of life.

Any crash program, whether it involved totalitarian methods or simply overselling the advantages of technical careers, would be objectionable for other reasons as well. It would jeopardize the quality of scientific and engineering training. It would put many young people in fields where they have little aptitude and deny them to other fields for which they are better equipped. And, if carried too far, it might even result in the overcrowding that was feared prematurely a few years ago.

The most important problems for the long run, as the preceding editorial in this series indicated, are in the area of education. Any real solution must reduce the loss of talented high school graduates who do not continue their education for financial reasons or because of lack of interest. Also, it must improve the quality of high school preparation in science and mathematics and, above all, relieve the critical shortage of teachers.

### Basic Needs in Education

Substantial increases in salaries of teachers in most of the nation's school systems are essential if high school students are to receive adequate preparation for courses in science and engineering. Pay scales that have lagged behind rising living costs and salaries available in industry have placed great strain on even the most devoted teachers. There has been a sharp drop in the number of new graduates trained to teach science and mathematics, and of this smaller number many have decided not to follow careers in teaching.

Raising teachers' salaries to more realistic levels must be primarily the job of local school districts, aided by state governments. If, in face of rapid increases in school enrollments, local and state resources prove insufficient, then federal aid will have to be considered. Higher teachers' salaries, however financed, inevitably mean higher taxes. But without appreciable improvement soon, the quality of our entire educational system is in danger.

At the college level also, financial aid is needed to provide scholarships for promising students and to increase faculty salaries. (An earlier series of editorials dealt more fully with these problems, and business aid to higher educational institutions has been mounting at a gratifying rate.)

But not all the educational problems related to the shortage of scientists and engineers can be solved with money. Science and mathematics have steadily been de-emphasized as more youngsters have gone to high school for terminal education rather

## How business is helping to relieve the shortage of technical manpower

### *Summary of a Survey by McGraw-Hill Correspondents*

- Sponsoring summer study programs for high school teachers
- Arranging cooperative work-and-study programs for students
- Sponsoring college fellowships and scholarships in science and engineering
- Paying tuition of employees taking science and engineering courses
- Keeping college faculties abreast of new developments in industry
- Hiring high school science teachers for summer and part-time work
- Giving old, but usable, laboratory equipment to schools
- Cooperating in high school science exhibits
- Sponsoring regional science fairs
- Sending speakers and training aids to schools
- Opening plants for student tours
- Analyzing jobs to relieve engineers and scientists of routine work

***The McGraw-Hill Department of Economics will be glad to hear of any other ways business is helping relieve the shortage.***

than for college preparation. This de-emphasis must be reversed.

Techniques of instruction, furthermore, can stand improvement at all levels of education. Professor E. P. Northrup of the University of Chicago observes: "In the past fifty years . . . there has been a revolutionary change in the character of mathematics, yet not a trace of this change is to be found in the curricula of all but a handful of secondary schools throughout the country." Colleges and universities may have to examine old fetishes about light teaching loads and small classes in order to make more efficient use of their faculties.

### **What Industry Can Do**

Industry has the immediate problem of better utilization of available technical manpower and the long-range responsibility of helping increase our resources of trained people. Frantic recruiting practices and reckless bidding up of starting salaries—financed largely by government money for defense orders—are not the answer. There is need for earnest consideration of incentives for experienced scientists and engineers, who too often must look to sales or executive positions for adequate financial recognition.

Industry in many instances could make more efficient use of engineers and scientists by shifting work to technicians, clerical personnel and even machines. One company found that 15% of the time of an engineering design group was spent on routine jobs and that this valuable time could be saved by adding a technician and a clerical worker to the group.

Other potential sources of technical manpower could be tapped more extensively to relieve the shortage. Very few women have entered what has been traditionally a man's world. Negroes are only slowly gaining educational and employment opportunities in technical fields. And many experienced older men can still give useful service.

### **A Good Beginning**

Much is being accomplished already in efforts to attract more young people into scientific and engineering careers. A summary of some of the things business is doing is presented above. Other notable contributions are being made by such organizations as the professional engineering and scientific societies (especially through their manpower commissions), the National Science Foundation, the National Research Council, the National Education Association, the National Merit Scholarship Foundation and the Thomas Alva Edison Foundation.

Results are beginning to appear in rising enrollments in engineering schools and technical institutes. Between 1951 and last year, according to McGraw-Hill's annual survey of technical institutes, enrollments in these schools rose from 46,000 to a record 67,000. Engineering enrollments rose in the same period from 166,000 to 243,000. A rising tide of graduates is already being made available to American industry.

**This is a good beginning. But only with wider appreciation of the serious implications of the shortage of scientists and engineers and intensified efforts on the part of business, government and education to relieve the shortage can we hope to overcome this threat to our national security and economic well-being.**

*This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.*

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*Donald C. McGraw*

PRESIDENT

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## Safety Congress (from p 81)

too much pride in good accident statistics that it is time to look for trouble. We cannot feel that a good safety program is all set up and operating nicely so long as we have any accidents."

Safety programs, Mr. Williams stressed, require constant promotion along with new ideas if a good selling job is to be done. Once management starts to coast a little on safety, the savings will be reflected in an increase in personal injuries and the accident rate will be as high or higher than it was before. Industry can no more afford to quit promoting and advertising safety than the merchant can afford to stop advertising his merchandise.

"We always welcome new ideas and plans that will assist in the furtherance of safety, and our personal letter experiment is just another approach to the problem of accident prevention. I am certain that all of us in the coal mining industry are thinking in terms of how to improve our own safety situation. We of this industry usually get some bad publicity on our mine accidents, and, unless we get more impetus into our safety programs, we are not going to be able to materially slow down our rate of accidents. Unless we get more action, human lives will continue to be wasted and coal mining will continue to be classed as a hazardous industry where mine workers' jobs are considered more or less unattractive."

From the floor, Harry Gandv Jr., director of safety, NCA, congratulated Mr. Williams on CF&I's safety achievements and suggested that their personalized safety program was one which might be more widely adopted by other producing companies.

## Hydraulic Fluids

Taking up the dangers of using hydraulic fluids, S. B. Polack, USBM, stated that oil producers, equipment manufacturers, mine operators, and state and federal inspection agencies should continue tests necessary to develop economical, fire-resistant hydraulic fluids.

Projecting data developed from a Bureau survey, Mr. Polack said that more than 10 million gallons of hydraulic fluid (enough to cover 1,000 mi of 12 ft entry to a depth of 1/4 in) are needed to mine 300 million tons of coal by mechanical means. Since the industry hopes to double coal production in 10 yr, the amount of hydraulic fluid would also be so increased, unless radical changes in design and maintenance are instituted. All fluids used in the mines surveyed were petroleum products and therefore flammable.

Survey data also shows (1) that hydraulic fluids are purchased on the basis of price instead of quality for safe and efficient use, and (2) that leakage is a major factor in their consumption.

Three types of fire-resistant synthetic fluids are available (straight synthetic, water-base synthetic and water-soluble oil emulsions) but these are either too high-priced (\$2.50-\$3.50 per gal) or not

yet well adapted for use in coal mining machinery.

Several producers are now working on a water-in-oil emulsion which shows considerable promise. One is already on the market for use in industrial machinery at \$1.25 per gallon. But as far as is known, it has not been tested under actual operating tests in coal mining. Makers of this fluid believe that it can be tailored for most uses in coal mines by the addition of additives to counter adverse conditions. However, experimental work is needed to confirm such claims and to determine whether pump starvation will result.

From the floor, James Westfield, USBM assistant director, health and safety, announced that a meeting would be held at the National Safety Congress to determine the next step in carrying forward Mr. Polack's valuable work.

## Roof Bolting With Continuous Miners

Presenting the first talk of the Tuesday afternoon session, George Stachura, Old Ben Coal Corp., summarized: "Continuous mining through better roof control makes possible much greater coal recovery."

Elaborating, he spoke on experience at Old Ben's No. 9 mine. At this mine it has been possible to support the top almost entirely by bolts where such support was necessary. Coal at this mine is produced from the Illinois No. 6 coal bed which averages 9 ft in thickness. The bottom is a soft fire-clay and the top varies considerably throughout the mine. Generally the immediate top above the coal seam is a shale of good structure.

In the south and west portions of the mine—where four Goodman boring type machines are operating—roof bolts are used in pillar sections only when slips are encountered or when rock is exposed. In this work props set on 3-ft centers as breakers have proven satisfactory.

In the east and north portions of the mine—where two Goodman 500 boring machines are operating—it has been necessary to bolt all places since the top coal is friable and does not offer very good roof support.

Old Ben's experience with continuous miners shows that they greatly simplify pillar mining. Since the gob is always 40 ft from developing room and each room is pillared as it is developed, the time element reduces the roof problems greatly. Ventilation is also simplified since each machine operates on a split of its own and no effort is made to sustain a 45-deg fracture line or an extreme fracture line.

Roof bolting with continuous miners sometimes means the difference between shutting down the mine or continuing in production on a profitable basis, Mr. Stachura said. He cautioned, however, that the practice of roof bolting is far from perfect, and that current knowledge of the subject is far from complete.

"There is a great deal lacking in roof bolting behind continuous miners. But

with the cooperation of those responsible for the present success of roof bolting, manufacturers, operators and mine bureaus will have much to contribute in the future to a method of bolting suitable to continuous miners."

## Roof Fall Fatalities

In the next talk, James D. Reilly, Hanna Coal Co., pinpointed certain actions necessary to obtain reductions in roof fall fatalities resting primarily on the foreman or section boss. But, he added, all management, labor and safety groups must cooperate with the foreman fully to enable him to do the most effective job. Management must be particularly careful in his selection and training.

With much expansion ahead and many old mines due for reactivation, renewed emphasis must be placed on the training of men who do the work of timbering and other phases of roof support. Much of the past training has been on a "catch-as-you-can" basis. The existing labor force must be retrained and re-disciplined, although, admittedly, in many cases, this is a difficult job. No less important, the thousands of young men who must be recruited to operate modern mine machinery should be thoroughly grounded in all safety practices.

With labor peace and the prosperity ahead, it should now be possible to start rolling again on safety. Each man concerned should appoint himself as a committee of one to participate in the new safety drive so that new achievements will be clearly the result of every man and group.

## 100% Training

In the final talks of the day, the accomplishment of 100% accident-prevention training in UMWA District 4 was discussed by J. A. Boyle, U. S. Steel Corp., and Andrew Rayner, UMWA.

Management in U. S. Steel, Mr. Boyle said, has long recognized the necessity for educating personnel to improve safety performance. Accordingly, when USBM offered the accident-prevention course to District 4, the proposal was quickly accepted and supported by U. S. Steel Frick District mines, most of which are located in UMWA District 4 in western Pennsylvania. The training program was begun at the Palmer mine during June, 1954.

To coordinate the work and to be certain that the classes could be held to the satisfaction of all parties, a meeting was held at each plant and was attended by the safety director of District 4, UMWA, the mine committee, the mine safety committee, the chief mine inspector, the mine superintendent, and a representative of the USBM. At this meeting, the support of the local union officials was solicited and proposed arrangements for the classes were discussed. Following this meeting, each individual employee of the mine was contacted by a committee consisting of the plant superintendent, members of the mine committee, the safety committee, and a representative of the USBM. At

this time, his cooperation and attendance was solicited. There was not a single instance where any of the men declined to attend.

The classes were held at locations convenient to each plant, at either the beginning or the end of each shift, so as to minimize the time that individuals were away from home. Classes were held 5 days each week for a period of 2 wk, or a total of 10 sessions. Each session lasted about 2 hr. The instructors held as many as 3 or 4 classes a day to best accommodate all of the people attending.

Attendance at the classes was indeed remarkable. At all 10 Frick District coal mines and shops, no less than 100% of the 6,715 employees and their supervisors participated. The entire program was completed during Feb., 1955.

While some time was spent in teaching the proper use of all types of safety equipment, much emphasis was placed on timbering, roof control and transportation, and especially the results of bad practices in all of these categories.

Completion of the training program at each of our mines was climaxed by a rally, attended by employees and members of their families.

The benefits obtained from the accident-prevention training, as from any other safety program, are difficult to evaluate quantitatively, but the apparent results have been satisfying. However, it would certainly have been erroneous to consider the course as a complete promotional program for safety in coal mines, rather than as an effective facet of a broader plan. Accordingly, the initial program was supplemented with a refresher course to promote a continuing interest in accident prevention. For that purpose, on-the-job training in sessions of 15 min each are now conducted, with the immediate foremen as instructors for their respective groups.

The follow-up plan offers the additional advantage of improving the instructing technique of the foremen. Then, too, there is no better way of learning a subject than to teach it. Furthermore, it places a greater obligation upon the foreman to set the safe example before his men.

Mr. Rayner said that accident-prevention training in the entire District 4 was completed in Oct., 1955. By that time, a total of 31 mines involving 15,700 miners, including supervisory personnel, had taken the course during the 16 mo the training had been given.

"Truly this was a remarkable achievement. We now pointed with pride at the accomplishment of training the entire membership in District No. 4. It was a job well done and we were justifiably proud, not only of the part the district organization had played, but were gratified beyond words that the people working the mines, whom we represented, so willingly accepted an accident prevention training program designed to protect them. We knew full well that the relatively simple matter of training people to work safely would not eliminate accidents, but we felt that we were cer-

tainly approaching in the right direction. Much, however, remains to be done.

"Safety to be effective must be practiced constantly. It must not be permitted to become dormant. With this precept in mind it is the intention of the district organization to constantly keep the idea of safe working practices in the forefront of the minds of our membership. This we know will be a never-ending task, but it is our pledge that the benefits reaped from the training program shall not be wasted.

"Organization, education and supervision are the fundamentals upon which the safe and efficient operation of any mine is based. To educate, it is not only necessary to inform the employee of the proper way to perform a given task, but also to teach him to think for himself. When this objective is obtained, he will become safety conscious and, by example, will influence the action of others."

### **Bleeder Entries And Mine Ventilation**

Opening the Wednesday afternoon session, Donald S. Kingery, USBM, summarized the results of 5 to 8 field studies by the USBM to test the effectiveness of active bleeder and ventilating systems used in gassy mines in Pennsylvania. The full text of Mr. Kingery's paper is presented in this issue of *Coal Age* on p 70.

### **Core Drilling And Mine Ventilation**

Sinking a ventilation shaft by core drilling is a faster and more economical method than the conventional method. Other advantages of a vertical core-drilled shaft are: (1) a maximum ventilating area for a minimum amount of excavation, (2) smooth sides stronger and less resistant to air travel, (3) circular construction highly resistant against shaft pressures, and (4) elimination of the need for a lining.

In a paper presented by Arthur Bradbury, Inland Steel Co., David A. Zeeger, Consolidation Coal Co., thus described the results of a ventilation experience the Consolidation Coal Co. (Ky.) had in opening its Marshalls Branch Portal 6 mi from Jenkins. This portal was situated near the center of Mine 204 workings, but the coal still had to be hauled about 5 mi to the central preparation plant. Along this haulway a ventilation problem was encountered in a certain section: how to provide a definite flow of air where air was going in either direction at various times and had sluggish air velocity at other times. A vertical core-drilled shaft proved to be the answer.

Mr. Zeeger said the total cost of sinking the 4 ft shaft to a depth of 63 ft 4 in came to \$5,817.52 or a cost per foot depth of \$91.90. Had the hole gone deeper, the cost per foot of depth would have approached \$60. By comparison, Mr. Zeeger added, the cost per foot of depth of sinking a 6x6-ft shaft by con-

ventional methods (about the same as for a 4x4-ft shaft) was estimated at \$157.40.

The changes in ventilation because of the vertical core-drilled shaft are very satisfactory, Mr. Zeeger said. From 8,000 to 10,000 cfm enters the shaft and positively ventilates the haulway in both directions at all times. If more air were needed, the intake could be substantially increased by minor changes in the ventilating system.

### **Underground Fire Fighting**

As seen by C. William Parisi, director of safety, Pittsburgh Coal Co., there are two basic needs for effective underground fire fighting:

1. Adequate fire-fighting facilities.
2. Proper training of all key personnel in the location and operation of the available equipment so that a minimum of time will elapse between discovering and extinguishing the fire.

The task of providing adequate fire-fighting protection in a coal mine is not a simple one primarily because the fire hazard is present at all times and in any location. Coal is by nature a combustible substance as is much of the material required for its safe extraction. Highly mechanized mines of today require extensive installations of bare trolley and feeder lines through many miles of haulage entries. Also, in recent years, mining machine manufacturers have expanded the use of hydraulics in mining machinery, thereby increasing the fire hazard at the face area. Many other developments in mining have tended to increase the dangers of fires and have magnified the problem of providing proper fire prevention as well as adequate fire-fighting facilities.

There is not much doubt that water is the best means of extinguishing fires and should be made available for that purpose. For effecting water lines, Mr. Parisi cautioned that they must be large enough in diameter to deliver an ample supply of water at an effective flow pressure at all times at any location in the mine.

Mines which do not have a natural supply of water must resort to other means of fire protection. Some mines use mobile fire cars containing several hundred gallons of water with suitable pumps, hose and other equipment capable of delivering sufficient water to extinguish a fire. Others use mobile chemical trucks for their fire-fighting facilities.

Mr. Parisi described the use of water lines and the various types of fire-fighting equipment in three mines in western Pennsylvania. At all three, he stressed that fire drills are conducted annually for key personnel and that all mobile fire-fighting units are tested at each practice session. A mine rescue team, fully-equipped is maintained and is trained monthly in the use of various types of gas masks and oxygen breathing apparatus.

## Illinois Institute (Continued)

2. A timbering machine mobile mounted on rubber tires, crawler or track that carries to installation points a supply of cross bars, rails, props, cribbing, cap boards and tools. It is equipped with a circular power-driven wood saw, and a hydraulically operated lifting boom capable of lifting, putting and holding in place the heaviest rail cross bars until permanent legs can be cut and set under the bar. The timbering machine provides a safe, efficient method for a crew of two men to handle, transport and install heavy roof supports, with a minimum of hazards to anyone.

3. A 15-min tape recorded program played through a system of amplifiers to the workmen while they are loading the man trips to go into the mine. Also a short 2-min safety message is played to the men after they are loaded and seated. These recorded messages put safety up to the workers every shift just before they go into the mine to their work.

In comment, Murrell Reak, Illinois Department of Mines and Minerals, congratulated Mr. Johnson on his "very fine paper on recent safety developments at Peabody mines." He added: "It would be well if all others would devote as much time and effort to this worthy cause."

Management's problem, Mr. Reak continued, is to convince the employee himself to be safe. In this way, the attitudes and behavior which invite accidents can be minimized or eliminated. Most injuries are preventable, and the safety supervisors should never be pessimistic.

The three main causes of accidents have been spoken of as the "three D's"—didn't see—didn't think—didn't know. Why not combat the "three D's" with the "three E's"—engineering, education and elimination? Education is the chief weapon in the prevention of injuries not only in small mines but in all mines and all industry.

In far too many cases, the primary cause of injury and fatalities in mines is due to lack of intelligent understanding of laws, safety rules and accepted safety practices on the part of employees, supervisory forces and employers. All must become better educated in safety from all angles. With increased general knowledge comes better judgment, and with better judgment comes safer and more efficient results. Injury prevention can be considered a never-ending plan requiring the advice, guidance, experience and cooperation of all concerned.

Mr. Reak deplored the use of the word accident when injury is meant. Such usage is "one of the definite mental blocks to the increasing drive to reduce injuries to our workers." When the average man thinks of accidents, he thinks of something over which there is no control. But, Mr. Reak stressed, most so-called accidents can be controlled—and this fact is the very basis of injury prevention.

### Extensible Belts

In a panel discussion on extensible belts, Louis S. Ahlen, Goodman Mfg.

Co., said that rope belt conveyors were built to fulfill the need for a conveyor transportation system which could be installed quickly, extended cheaply, and at the same time reduce supply line traffic and maintenance cost.

The first use of rope belt conveyors was started about 2 yr ago. The range of application has not yet been fully developed. However, certain benefits and advantages of the rope belt, as compared to a conventional rigid type conveyor, have been found.

One of the most important advantages has been the very drastic reduction in installation and extension time. Time studies at one mine operating in the midwest show that it took 24 man hours less to install a 36-in rope belt conveyor extension than it took to install the same length and width of conventional pan-line extension. In another instance, installation cost for a 4,000 ft long 48-in wide rope belt conveyor was only one-third of the cost for a conventional pan-line of the same dimensions.

Other advantages and benefits for rope belt conveyor systems, Mr. Ahlen listed, were:

1. The flexibility of the entire unit provides impact resistance and has eliminated the need for impact rollers at loading stations. This, together with an anticipated reduction of friction losses, will undoubtedly result in minimum belt specifications and a corresponding saving in belt life. Belt edge wear is greatly reduced due to ample side clearances for the return belt.

2. A panline is not required. Thus, much material is eliminated and supply line traffic is eliminated.

3. Spillage is minimized due to the hinged action of the carrying idler which permits the belt to hug the load.

4. Construction conforms readily to normal undulations in the mine floor. It also reduces the cost of underpassing since no super structure is required to support the ropes.

5. The conveyor can readily be installed and maintained on sight lines. Roof anchors are placed on sight line and, when ropes are tensioned, the belt has to be on sights.

6. Last, but not least, there is a lower first cost.

The basic function of the Jeffrey Molveyor, J. W. Stevenson, Jeffrey Mfg. Co., stated was to provide for the continuous transportation of coal from any type of continuous mining machine, thereby increasing the percentage of operating time and, at the same time, giving the flexibility and mobility needed for both development work and pillar extraction.

Although only one 30-in molveyor is in operation, experiences prove that it is a successful mining machine—a machine that will be accepted by the mining industry as one solution to the continuous haulage that is becoming so necessary to approach continuous mining.

Mr. Stevenson described the Jeffrey Molveyor as a train of portable belt conveyors whose framework is mounted on solid rubber tires and permanently connected. The method of mining determines the length and once established,

the train functions as a unit. It consists of a 19½ ft long receiving section, a specified number of 15 ft long intermediate sections and a 28 ft long discharge section which includes a 9½ ft long swinging boom for loading into the center of the mother belt.

Among other specifications, Mr. Stevenson noted that the maximum height of the molveyor is 32 in with a road clearance of 6 in. The maximum width is 66 in while the hopper on the receiving section is 56 in. The conveyor belt is 30 in wide and is driven at 400 fpm. Its carrying capacity has been arbitrarily set at 4½ fpm which is a little less than two-thirds of the carrying capacity of a 30-in belt at 400 fpm belt speed according to Nema specifications.

In operation, the molveyor follows the colmol or other type of continuous mining machine into the place with the receiving end operator tramping the machine under the end of the discharge conveyor of the continuous mining machine. He then signals the operator on the discharge end by telephone or electrically operated gong to start the belt conveyors. The belts start in sequence with the discharge boom conveyor belt starting first and the receiving section belt starting last. With this arrangement, if any belt should stop, all inby belts will automatically shut down and not bring coal to the stopped belt. The continuous mining machine continues to advance until it is stopped because of roof bolting or timbering, ventilation, or because the discharge end can no longer reach the mother belt. The discharge operator then trams the machine back down the entry paralleling the mother belt.

Mr. Stevenson added that the receiving operator only can advance the train and the discharge operator only can retreat or pull back the train. After the train is pulled back, the continuous mining machine either makes a secondary cut or trams to another place where the cycle is repeated.

Picking up the discussion, R. V. Jackson, Robbins Conveyors Div., Hewitt-Robins Inc., commented: "It will not be many years before the most modern methods of so-called continuous mining will be in universal use and any haulage system being considered today should be designed to include the possibility of a continuous mining system. This is true for new mines being developed or for old mines being extended. Mining systems will continue to use track haulage under certain conditions, but very frequently they will be supplemented with belt haulage units."

Service haulage at the face is relatively new, as required for continuous mining operation. As new continuous type miners are developed, a service transportation and mining system must be developed for them.

Several methods of transportation might be suitable for each individual operation, but only the mine operator and his consulting engineers who know the individual mine's requirements and conditions can make the proper selection and establish the proper system of mining. However, Mr. Jackson stressed, to make



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Power shovel of Hanna Coal Company, Division of Pittsburgh Consolidation Coal Company, at work in its Georgetown No. 12 open-cut mine.

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## Illinois Institute (Continued)

a successful operation, good installation, good operation, and above all, good housekeeping, are vital.

Concluding the panel discussion, Richard E. Paddock, Joy Mfg. Co., presenting a paper by William Hanson of the same company, said that the extensible belt is just one item in an ever-increasing group of highly mobile conveyors which can offer improved production at reduced cost. The economy of mobile conveyor units is due to many advantages stemming from their simplicity, mobility, and ease of installation and extension. These advantages enable more efficient use of men, materials and operating time.

Mr. Paddock emphasized that the most important item in the economy of belt conveyors is the one most frequently ignored. This is proper use. Therefore, he said, in planning to use mobile conveyors:

1. Train men in the proper use and handling of conveyors.
2. Develop regular inspection and maintenance programs.
3. Remember that the belt is the most expensive item in the conveyor and full use should be made of all devices provided to protect it.
4. Get the equipment to do the job and don't try to send a boy to do a man's job.
5. Set up regular procedures for all phases of operation.
6. Establish the rules, then see that they are obeyed.

Belt conveyors are still the cheapest method for hauling bulk materials but the economy comes not only from inherent qualities but from wise selection and rigorous programs for operation, maintenance, and training.

## Anthracite Conference (Continued)

board, with their tremendous demand for energy, may prove to be the key to the production of high btu gas in the anthracite region. Performance data and cost estimates have been examined for processes of this type; on the basis of present knowledge, it appears that the Lurgi process holds the most promise for immediate application.

It is recognized that early establishment of a commercial-scale, high btu plant for gasification of Pennsylvania anthracite is of prime importance. The reliable technical data that could be obtained from such a full-scale operation would have inestimable value in the future development of a low-cost process for producing synthesis gas.

Because the future will undoubtedly bring tremendous expansion in the use of synthesis gas for producing basic chemicals and liquid and gaseous synthetic fuels, an investigation of the behavior of anthracite in gasification equipment has been proposed. The first investigation will be concerned with testing "standard" anthracite and rough-cleaned and rough-sized material in



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**POWER for the Climb — SPEED for the Haul Road**

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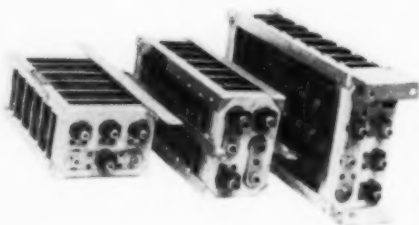
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1. Low cost for a premium class resistor.
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With mining machines and mechanical loaders becoming so vital to low cost production, Guyan Resistors have been designed to give trouble-free operation on all types of mechanical equipment.

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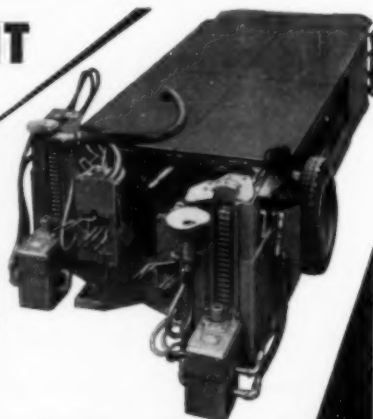
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Here's the perfect bolting machine for boring type miners! This FLETCHER Drill is built to take the roof control problem entirely out of the operator's hands. The feed is automatic. In soft or hard roof, or any combination of the two, it will provide maximum performance with no operator's skill required.

After the operator starts the drill into the roof he need never touch the controls! Both rotation speed and thrust are automatically controlled! In hard drilling the rotation is slow and the thrust high; when soft areas are entered the rotation speed increases and the thrust drops!



Besides the convenient narrow width there are two distinct advantages:

1. The drill automatically penetrates at the maximum rate in hard and soft drilling because the proper pressure and speed for each type is automatically applied.
2. The bit operates at full efficiency 100% of the time — giving maximum bit life and minimum bit cost.

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## Anthracite Conference

(Continued)

a high-pressure fixed-bed unit to obtain comparative performance data. This work should also determine what process phases, if any, require additional research and development work to effect necessary economies in gasifying anthracite. It is expected that these tests will determine the minimum preparation required for a fuel feed that will be adaptable to the gasification process, economically as well as technically. The need for investigation into the use of higher gasification pressures also may be indicated.

The importance of developing more extensive knowledge of the fundamental physical and chemical properties of anthracite is recognized, and work is planned along this line.

Direct generation of electricity in fuel cells merits serious consideration. The rapid growth in the electric power demand, high fuels costs, and the necessity of improving overall generating efficiency are focusing attention on this device for generating electric power. As time and funds permit, USBM would like to investigate any possibilities the fuel cell might have for anthracite.

As regards mining methods, it is planned to complete the research already begun on the vibrating-blade coal planer by creating a complete production system. Studies will be made of the unit under production conditions to determine the best method of operation and to demonstrate the value of the method to the anthracite industry.

## Sintering Market

Speaking on "Anthracite and Dwight-Lloyd Sintering," Harold E. Rowen, Dwight-Lloyd Sintering Div., McDowell Co., said:

The availability of bituminous coals and coke without high freight costs is giving them an advantage in sintering but anthracite should be able to capture a good slice of this market with a superior product and with intelligent co-operation by the user. Anthracite's market in sintering now amounts to something less than two million tons.

Although sawdusts, wood chips, charcoal and other fuels are used slightly, the solid carbons such as coal are usually preferred. The clean sharp heat of anthracite fines, properly ground and clean, is a preferred fuel. Volatiles are low compared to bituminous coals and the abrasiveness of coke is avoided.

Dwight-Lloyd sintering is one of the most extensively used processes for agglomerating finely ground, concentrated ores, Mr. Rowen stated. In this process intimately mixed solid fuels are used. The fuels may actually be a component of the material being used such as those having appreciable amounts of sulphides, or carbonaceous shales.

## Decrepitation of Anthracite

The final paper, "A Study of the Decrepitation Properties of Anthracite on Pyrolysis," by Leon Delvaux, R. J. Grace, T. S. Polansky and Irwin Geller, The Pennsylvania State University, was presented by Mr. Polansky.

THE



RAYMOND

# Flash Drying SYSTEM

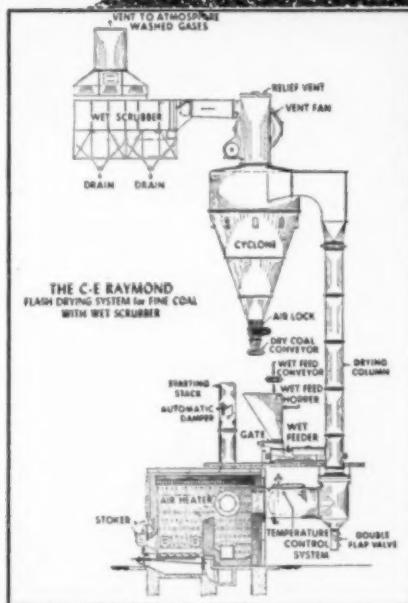
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This modern coal drying equipment is carefully engineered to each specific job so as to provide any desired capacity requirements for the production of fine coal from  $\frac{3}{8}$ " or below in particle size.

It combines important new developments and operating features that assure utmost economy in the process and uniformity of product.

The fast drying action and the new type coal trap help to solve the coal degradation problem even in the softer coals. The addition of a special wet scrubber device to the vent system controls air pollution around the plant to meet smoke ordinance restrictions.

Smooth, clean, automatic operation, ease of installation with low power consumption and minimum maintenance costs, are some of the reasons for the widely increasing use of C-E Raymond Flash Drying System in coal preparation plants.

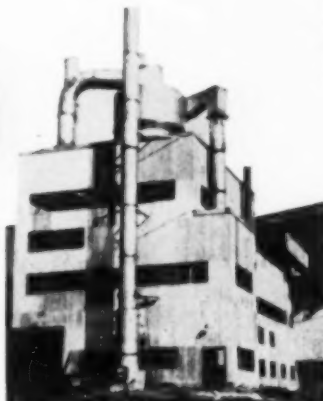


For further details,  
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of C-E Raymond Flash  
Drying Systems for  
Fine Coal.



One of the larger installations at a Western Pennsylvania plant—175 Tons per hour of  $\frac{1}{4}$ " x 0 coal, dried from 8% to 2% moisture, with multiple drying column.

C-E Raymond Flash Drying Systems built to serve large and small coal preparation plants—with single drying column for handling 10 to 80 tons per hour. Multiple columns connected to one furnace for higher capacities.



Typical of smaller plants — Alva, Kentucky — Two grades produced: 45 tons per hour of  $\frac{1}{4}$ " x 28-mesh; and 15 tons per hour of 28-mesh coal with final moisture content of 2%.

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## W. Va. Institute (from p 83)

because of ample side clearances for the return belt.

3. No pan line is required. Thus much material is eliminated and supplying is simplified.

4. Spillage is minimized because the hinged action of carrying idlers permits belt to hug load.

5. Conforms readily to normal undulations of floor. Cost of underpassing is reduced since no structure is needed to support the ropes.

6. Can easily be installed and maintained on sight lines.

7. There is a lower first cost.

In response to questions from the floor, Mr. Ahlen said that 2,000 ft of rope belt cost about \$60,000 and that a unit with a 19-in height is operating successfully in 30-in coal. On the question of belt timing, the author said they are eased because of the horizontal and vertical deflections of the idler assembly.

Queried on belt speed and maximum practical length, Mr. Ahlen reported that a 4,000-ft unit is traveling at 650 fpm and that 4,000 ft may be too long because of economic considerations. Belt speed is determined largely by the volume of coal to be handled. Power consumption is about the same as for a conventional conveyor.

### YIELDING ROOF JACKS

"For complete extraction of the coal in longwall mining, timbering must be designed to provide three things: (1) protect men and machinery; (2) permit subsidence of the roof under the dead weight of the overburden; and (3) lower the roof to the floor in a systematic manner."

This was the way Mr. Carman described the timbering needs at Eastern Gas & Fuel Associates' coal planer operation at Stotesbury No. 8. In leading up to the timbering problem, Mr. Carman described the coal planer which operates on a 330-ft face in the Pocahontas No. 4 seam. Seam height averages 39 in and undulates greatly with grades exceeding 18%. Overburden varies from 750 to 1,300 ft. The immediate roof stratum is not parallel to the coal bed and at times horsebacks, rolls and kettlebottoms are present. The floor is mostly hard shale with sandstone present 3 to 10 ft below.

Exceptionally high pressures are encountered wherever the overlying Beckley seam was too thin to mine economically or where isolated pillars were left.

Two types of roof supports are used at Stotesbury. The main type is steel or alloy collapsible props with cantilever bars or headers. Secondary reinforcement is provided by wood cribs with steel chock releases, Mr. Carman explained.

Secondary-reinforcement by the wood cribs performs the following functions: (1) lessens the danger of side thrusts of the roof; (2) provides additional support when used with props; (3) helps prevent props from penetrating soft bottom; and (4) allays the fears of the miners. Cribs are built of 6x8x24-in wood blocks with one tier made up of a steel chock to

facilitate removal. Cribs are placed on 10- to 20-ft centers, depending on face conditions.

Hydraulic, rigid mechanical and yielding mechanical props were tested at Stotesbury and each was found unsatisfactory. The hydraulic prop yielded completely at 20 tons. The mechanical prop with a friction-ring type yielding device was rather light and had to be reset after each loading over 40 tons. Loading tests on the rigid mechanical prop showed that it was overloaded long before it was ready to be removed. As a result, the company decided to try yielding props.

Results of tests on the yielding units showed that these jacks not only held the roof but also permitted it to yield 3 to 6 in at the gob side, causing it to break into long slabs about 4 ft wide instead of producing the highly fractured material caused by the non-yielding props. For the particular conditions at Stotesbury, Mr. Carman said the yielding props meet the company's needs and have the following five important features:

1. Adjustable height to fit varying thickness of the seam.

2. They are set under load to secure an even resistance to further load.

3. They yield mechanically when the load approaches the point of failure of the roof.

4. They collapse instantly to facilitate removal.

5. The yield mechanism is automatically reset each time the prop is reset.

In conclusion, Mr. Carman summed up the advantages of the yielding props as follows:

1. Supports roof and permits enough yield to prevent extreme pressure on props.

2. Produces less shock on roof when tripped.

3. More easily recovered because of less fractured roof.

4. Roof subsides directly over immediate face, loosening top coal and shearing it from face.

5. Less breakage of cantilever bars.

6. Fewer jacks to repair and discard. Lower maintenance cost.

7. Simple design makes repair easy.

8. Increases production.

In the question period following delivery of the paper, Mr. Carman said that headings are bolted on the advance to provide a clean opening as the longwall retreats. Bolts usually are recovered. Output averages 550 tons per shift with 23 men and supply cost is about 23¢ per ton.

In response to further questions, the author said that only about 3% of the yielding jacks are destroyed in the mining operation. There also is an application for yielding jacks in continuous mining and for safety posts. A heavy-duty jack weighs about 125 lb.

### TRANSPORTING MEN

"At the present time, the use of portal buses in the transportation of face personnel has permitted a reduction in the average travel time per shift to less than 40 min in most instances. This saving of approximately one-third of our travel time results in an additional available

productive time of 20 min per manshift and is equivalent to the employment of 39 additional men; and represents nearly the manpower required to man one additional conventional unit for a three-shift operation."

This was the way Mr. Pero summed up the time saving resulting from installation of portal buses at the Itmann mine of the Pocahontas Fuel Co. The company expected and received a material savings in travel time, which by next year will represent the full amortization of the purchase price of the portal buses.

The solid inner wall on the trolley wire side of the bus also offers a convenient place for the placement of safety posters. Men are exposed to the safety message during a period when they can relax and are in a receptive mood.

The company also is exploring the possibility of channeling through the trolley phone system short safety messages. These would be delivered to the men while the portal buses are in transit. This can be done by placing all the portal bus trolley phones on a different wave length than used by the haulage units. Thus interference with routine dispatching would be eliminated.

The portal bus also can be converted into an efficient underground ambulance by fitting the stretcher with an attachment that fits the bottom contour of the front or rear compartments. The attachment is hinged and can be readily swung out of the way where it does not interfere with normal use of the stretcher, Mr. Pero explained.

In conclusion, Mr. Pero listed the following benefits resulting from use of the portal buses:

1. Greater safety for riders.

2. A one-third reduction in travel time.

3. More time for coal gathering and supply hauling.

4. Transportation delays, except derailments, have little effect on getting men to the surface on time.

5. Buses provide a means of implementing safety and labor relations programs in surroundings where men will be in a receptive mood.

6. Buses provide a readily available means of transporting injured persons to the surface.

Continuous mining, a bored-hole shaft portal and aerial mapping for coal mining were topics at the Friday afternoon session, with Jesse Redyard presiding.

### CONTINUOUS MINING

"Experience at the Keystone mine of Eastern Gas & Fuel Associates with the Lee-Norse continuous mining machines, designed for operation in low coal, reflects a brighter production future, based on an initial performance, as compared with conventional mobile mining methods."

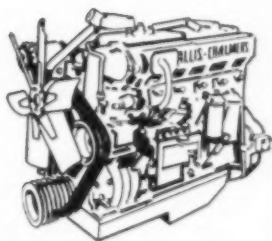
This was the way C. J. Kirby, production engineer, Eastern Gas & Fuel Associates, Beckley, W. Va., summed up his company's experience after describing the development of the Lee-Norse continuous miner.

The machines are operating in the Pocahontas No. 3 seam which consists

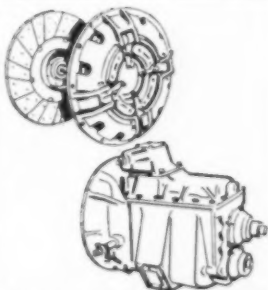
# Look at the **EXTRA** **WORK OUTPUT**

the Allis-Chalmers TS-360  
Motor Scraper gives you

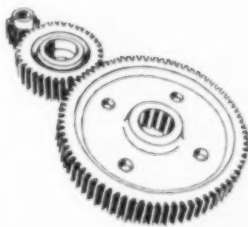
Here are some of the design features  
that put the TS-360 way out in front in  
steady performance, dependability and  
length of service life.



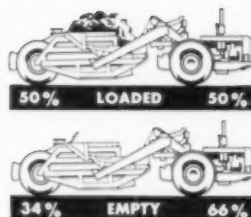
**MORE USABLE HORSEPOWER.** Allis-Chalmers diesel engine delivers 280 hp — 18.66 hp for each truck yard. This power gets the TS-360 away from the pusher fast... gives you speedier cycles, more trips per hour. In this engine, follow-through combustion holds effective working pressures to take advantage of better crankshaft leverage



**BIG-CAPACITY CLUTCH AND TRANSMISSION** give fast, smooth operation under all job conditions. Clutch has air-actuated booster to reduce clutching effort and increase shifting efficiency. The heavy-duty transmission gives unmatched torque output in each gear range.



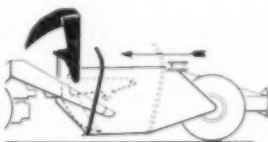
**EXTRA-HEAVY FINAL DRIVES** feature rugged differential assembly, carrier-housed drive shafts, final drive gears supported by large roller bearings and heat-treated drive axles. This long-life power train transmits maximum engine output for extra work volume, extra profit.



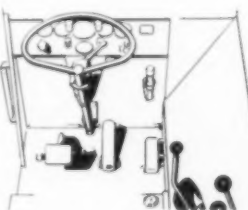
**EXTRA TRACTION.** The TS-360 motor scraper provides greater tractive effort, loading or traveling. Two-thirds of the empty weight is carried on drive wheels. Loaded weight is distributed equally between tractor and scraper wheels for better balance, increased flotation, safer hauling.



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**OPERATOR CONVENIENCES** add to production, too. Easy-to-reach controls, full visibility, four-wheel air brakes, roomy platform, comfortable air-foam seat are some of the features that help operator get maximum output from the TS-360.

More and more TS-360's are coming into your area every day. Ask your Allis-Chalmers construction machinery dealer where you can see them in action. Remember, too — your Allis-Chalmers dealer stocks True Original Parts and offers factory-approved service methods and factory-trained servicemen for your convenience.

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## ALLIS-CHALMERS



## W. Va. Institute (Continued)

of 24 in of coal, 4 in of bone and 31 in of coal, a total thickness of 59 in. The coal is soft and friable, offers great resistance to digging or conveying and is extremely poor in loadability. Immediately over the coal is about 12 in of drawslate which contains many kettle-bottoms, horsebacks and slips. It is said to be one of the most dangerous mine roofs in the state, Mr. Kirby noted.

In continuous mining, the company found it advantageous to decrease the number of places adjacent to a robbing line to a minimum, thus eliminating much reconstruction work and greatly improving physical conditions, Mr. Kirby explained.

The Lee-Norse continuous miner discharges its coal directly into Joy 6SC shuttle cars, two of which are employed in the system. They in turn carry coal to a 30-in belt which discharges into 145-cu ft mine cars. The machines work in room and pillar work in entries developed by conventional units. Thus room centers were designed not only to satisfy the desirable feature of minimizing exposure of operator and machine but also to satisfy breakthrough centers in the headings. Rooms are driven 17 ft wide on 63-ft centers. Pillar splits are 18 ft wide, making a 14x53-ft pillar to be removed in lifts 9 ft wide. Because of gaseous conditions, it was necessary to limit penetration to a depth of 6 or 8 ft and then take the second lift to make the full width, Mr. Kirby declared. The objective is to maintain a flat robbing line by successive removal of the 46x53-ft blocks with a minimum of room development.

Roof in rooms, headings and breakthroughs is supported by bolts on 4-ft centers, with headers added because of the nature of the roof. In main pillar splits only two bolts are used on the pillar side of the split and a post is set under the opposite end. As lifts are made additional posts are set under the headers. Steel jacks and cribs are added when the final lift is made, Mr. Kirby explained.

During the first 6 mo of 1956, three continuous miners worked 713 shifts, producing 166,418 tons of clean coal. Crews averaged 7.9 men and output 233 tons per shift or 29.6 tons per face man. Reject is 23% and thus 303 tons of raw coal was produced per shift. Bit cost was about 3c per ton, Mr. Kirby said.

### BORED-HOLE SHAFT

Among the top benefits from an unusual shaft-portal installation at Trotter Coal Co., James Trotter, president, listed the following:

1. Reduction of travel time.
2. Elimination of hoist operator.
3. Inexpensive.
4. Compactness of the hoist drive.

Features of the portal include boring a 72-in diameter hole 467 ft deep with a new-type core drill (*Coal Age*, January, 1955, p 80); and installing a friction-type hoist that handles a specially designed double-deck cage that travels in the circular opening (*Coal Age*, November, 1955, p 60).

Since the new portal has been in operation, Mr. Trotter said his company has saved 45 min per man per day. The entire job was done at one-half the cost of conventional methods. It cost about \$70 per foot to drill the shaft plus \$11 per foot for bits. After the first hole was drilled the machine was completely rebuilt and can now drill twice as fast.

### AERIAL MAPPING

In reviewing the history of aerial mapping, Lewis H. Reiland, assistant engineer, Pocahontas Land Corp., Bluefield, W. Va., said that many refinements have been made and it is now possible to photograph large areas in a short time and get accurate maps in a short time. However, it requires highly skilled personnel to use the system.

It takes only a few hours to photograph 5,000 to 10,000 acres and maps can be made at half the cost of a ground survey. They can be compiled in one-fifth to one-half the time required for a ground survey. And many details are obtained that would otherwise be prohibitive in cost, Mr. Reiland explained.

The price of aerial mapping varies with the size and shape of the area, map scale and details available before mapping is started. In general, it cost about \$1.50 per acre to provide maps with a 10-ft contour interval and it is sometimes possible to provide maps with a 20-ft contour interval for 35 to 50c per acre. The aerial method has been developed so that the maps meet any civil engineering specification, Mr. Reiland said.

Presiding at the Saturday session was Woods G. Talman, general superintendent, Gary district, U. S. Steel Corp., Gary, W. Va. H. E. Mauck, general superintendent, Olga Coal Co., Coalwood, W. Va., was co-chairman. Lead-off speaker was Lionel Sarff, chief engineer, West Virginia development, Hanna Coal Co., Moundsville, W. Va. Other speakers were D. W. Parsons, chief of construction division, American Gas & Electric Service Corp., New York, N. Y., and Ralph Stohl, Olin Mathieson Chemical Corp.

### IRELAND MINE

The Ireland mine property covers 180 sq mi or 120,000 acres and contains 600 million tons of coal, Mr. Sarff said in setting the stage for his description of the development of the new property. Holdings were acquired in 1946 and by 1952, the company was able to offer a combination of energy source, industrial sites and water transportation to the aluminum and chemical industries.

The first problem in planning the Ireland operation was how much it would cost. Decisions were made quickly and the engineers estimated that a 3 million-ton mine could be opened for \$13 million, or \$4.45 per annual ton. The surface installation will cost \$6 million and will include facilities for washing the plus % in coal and loading barges. Reasons cited for cleaning the coal were: (1) inspection of adjoining properties indicated that there would be trouble in supporting the roof and that clay veins and rolls would be present; (2) the coal would be processed by a char plant and excess im-

purities for a short time would disrupt the process and possibly cause an expensive shutdown; and (3) the material that would go to refuse could be re-processed and the coal in the rock could be recovered on the picking table. Overall plant design has been kept as simple as possible, Mr. Sarff explained.

Coal will be cleaned by two Chance cones operating at 1.60 specific gravity. Dewatering and desanding will be done on two special Hanna-built screens that are smooth running and trouble free. The new screen uses the principle of eccentric weights revolving in a horizontal plane through the center of gravity of the screen. Products will be 6x1 $\frac{1}{4}$ , 1 $\frac{1}{4}$ x% or 1 $\frac{1}{4}$ x0 with %x0 blended as desired. An outstanding feature of the plant design is that material will flow from top to bottom by gravity and screens, and all scraper and drag conveyors will be eliminated from the plant.

Plant products will be conveyed by two 48-in belts to a transfer tower where blending, sampling and routing will be handled. From there it will flow to the power plant stockpile, to barge or to railroad cars, Mr. Sarff added.

Underground output will be produced by continuous miners. Each producing section will be equipped with a 600-kva power center, panel belt, four continuous miners, eight shuttle cars and four bolting machines. One continuous miner and two shuttle cars will be maintained as standby units, Mr. Sarff declared.

The main haulage system will be made up of two tracks and will ultimately be 15 mi long. It will be made up of 85-lb rail which will be welded. A Joy 18HR rock loader will be used for loading 7 ft of top rock which will be taking in all main headings.

All face equipment will be AC powered, Mr. Sarff said the decision to use AC was made for the following reasons:

1. Maintenance is simpler and less expensive.
2. Less lost time because of electrical failures.
3. Lower initial cost. A 500-kw rectifier costs about \$54,000 and equivalent AC equipment costs about \$10,500.

Disadvantages include less flexibility and serious delays can result if cables are not handled properly.

Sinking of the supply slope was begun on August 15, 1956. On October 15, the opening had been driven 500 ft to the coal. Equipment used in the slope included a Joy 18HR loader, extensible belt and air drills. A description of this method appeared in *Coal Age*, November, 1956, p 68. The coal slope will be more difficult to drive. It will be 1,040 ft long with an 8x18-ft cross section, Mr. Sarff declared.

Three vertical shafts are in process of being sunk by the blasthole technique. A description of this technique appeared in *Coal Age*, April, 1955, p 74.

### POWER AND ALUMINUM

Early in 1956, Olin Mathieson Chemical Corp. and Ohio Power Co., a subsidiary of American Gas & Electric, announced negotiations whereby Ohio Power Co. had agreed to build and oper-



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A dozen installations of the new Heavy Duty "S" Crusher prove that it cuts labor costs by eliminating men at the picking tables.

It also offers important savings in recovered coal—coal that was formerly thrown away because of imbedded impurities. It is now crushed and washed for reclamation.

By cutting labor costs, by adding to your output, the new Crusher pays for itself in less than a year. From then on it's clear profit.

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#### W. Va. Institute (Continued)

ate a three-unit plant at Cresap, W. Va., capable of a total output of 675,000 kw. Two-thirds of the power would supply the newly formed Olin Revere Metals Corp. aluminum reduction plant to be built at Buckhill Bottom, Ohio, and one-third to go into the Ohio Power Co. and Wheeling Electric lines and integrated system of American Gas & Electric. This plant will consume 2,300,000 tons annually of West Virginia coal, Mr. Parsons said.

The Kammer plant, one of the first semi-outdoor installations in the AGE system will have three high-pressure, high-temperature steam generating units complete with primary and secondary superheaters, reheaters, economizers and regenerative-type air heaters. Fuel for the plant will be char provided by Pittsburgh Consolidation's low-temperature carbonization plant located nearby, Mr. Parsons reported.

In describing the Olin Mathieson-Olin Revere aluminum project, Mr. Stohl covered the third phase of the coal to electricity to aluminum project now being constructed on the Ohio River. Included in his talk were the history of the Olin Mathieson Chemical Corp.; why the site on the Ohio River was chosen; a description of the new Olin Revere Metals Corp.; details of the aluminum process; why Olin Mathieson went into aluminum; and the effect of the industrial growth on the surrounding area.

The site provides an ideal location near large top-quality coal deposits which would provide a vast supply of economical power. Also the location was near the center of the aluminum buying market, thus transportation cost of the finished product would be lower. The Ohio River and railroad facilities provide excellent transportation. There also is enough room for future expansion, Mr. Stohl explained.

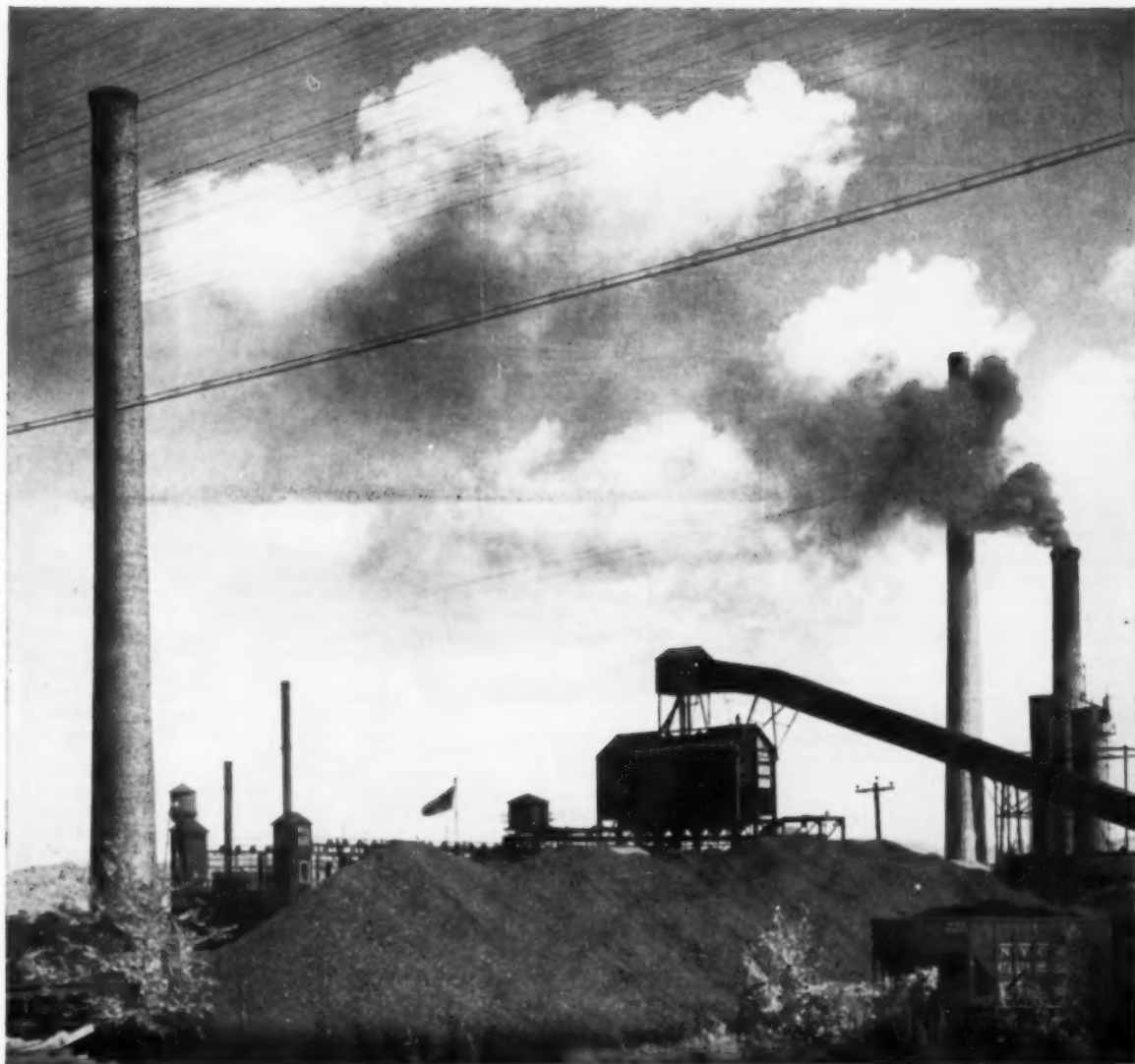
#### Kentucky Institute (from 89)

U. S. Bureau of Mines, Washington, D. C., and James H. Phalan, chief, Kentucky Dept. of Mines and Minerals as moderators.

In noting the overriding need for increased roof safety, Mr. Ankeny declared that minimum standards in roof support must be observed and pointed out the need for discussion of attitudes.

On Mr. Ankeny's keynote, William B. Wright, general mine foreman, Blue Diamond Coal Co., Leatherwood, Ky., discussed the attitudes of supervisors, noting that supervisors at Blue Diamond operations sincerely believe that no one wants to be injured. Each foreman, therefore, must see that such conditions prevail that safety is served, and this should be their foremost concern.

Concerning the attitude of workmen, E. M. Pace, general superintendent, Inland Steel Co., Wheelwright, Ky., pointed out that his remarks were based upon personal interviews among Inland's safety



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## Kentucky Institute (Continued)

inspectors and 52 face men in representative jobs, since workmen are the only ones competent to express their attitudes.

It was evident, Mr. Pace said, that workmen are convinced education and training play an important part in reducing roof fall injuries. They also felt that portal safety meetings are effective, assuring total participation in safety.

Workmen feel that section foremen should play a key role in developing a positive attitude toward roof safety, and the off-going foreman should be sure the on-coming foreman is fully informed of roof conditions.

The interviewees cited the advantages of positive leadership without attempting to relieve themselves of responsibility. They did feel the need to be brought up to date and to be cautioned at times, Mr. Pace said.

In response to a question as to what they would do if they had full responsibility, the men who were interviewed said they, too, would concentrate on applying present measures to better advantage before trying any new measures.

In discussing the attitudes of State and Federal inspectors, Harold Ford, superintendent, W. G. Duncan Coal Co., Madisonville, a former inspector, declared that in his experience all inspectors have shown a cooperative attitude toward roof-control problems. Not every time was it possible to find a solution, and not every time was agreement reached on a solution. But reasonable disagreement brings about discussions that may provide new ideas.

"I have seen mine inspectors attempt to impress upon the miners the importance of working safely," Mr. Ford said. "I think this is a good practice. . . . I continue to believe that more progress would be made in safety if inspectors could do more talking and teaching during their visits instead of the routine inspection report with numerous recommendations."

Speaking on the attitudes of management, E. E. McGaw, general superintendent, West Kentucky Coal Co., Madisonville, noted that management and employees are more safety-conscious now. The human element is important and management must assume its responsibility for safety.

In continuation, Arthur Bradbury, assistant manager, Inland Steel Co., Wheelwright, pointed out that management must provide positive leadership in initiating programs designed to increase roof safety.

Mr. Phalan declared that there is nothing wrong in the inanimate world. The fault lies in men's attitudes—and attitudes can be changed.

Final paper of the session was on ventilation and dust control with continuous miners, by J. A. Hagy, manager of coal mines, Alabama Power Co., Gorgas, Ala. The complete presentation was published over Mr. Hagy's signature in the July, 1956, issue of *Coal Age*.

In a formal discussion of dust control, E. J. Moroni, plant manager, Bell & Zoller Coal Co., Madisonville, introduced the idea of providing a self-con-

tained dust-collection system on some types of continuous-mining machines. It could include a hood over the throat and conveyor section. A vacuum could be applied within the hood and the accumulated dust conducted through flexible tubing to the return side of a substantial line curtain.

Cochairmen were Mr. Moroni and C. D. McDowell, assistant secretary, Harlan County Coal Operators Assn., Harlan, Ky.

Lead-off speaker on Friday afternoon was Prince Thornton, assistant director of public relations, Appalachian Power Co., Roanoke, Va., with a "Rannel-board" presentation entitled "Coal by Wire." Session chairman was L. R. Buckner, safety director, Western Kentucky Mining Institute, Madisonville.

Mr. Thornton described his job as an effort to inform people in order that public opinion might be in favor of the coal-and-utility partnership. The coal industry, itself, must take greater interest in industry-wide public relations, after determining just what the minds of America really think of coal.

With respect to coal's own power needs, Mr. Thornton pointed out that in 1890 production per man-year was 508 tons. In 1945 production per man year was 1,508 tons, and today it is 1,560 tons. In 1948, the coal industry used about 6% of the nation's power in producing the finished product. Now it uses 18%, Mr. Thornton said.

Coal consumption will continue to rise, especially in electric-power generation, since each new home requires that 1 ton more per year be burned at the power plant and our population is increasing rapidly. Atomic power, alumina reduction, chemical industries and electric heating are increasing or coming markets.

Transportation capacity, as well as cost, is a problem. However, Mr. Thornton noted that Norfolk & Western and New York Central railroads have placed orders for 15,250 new hopper cars.

Harper Gattton, executive vice president, Kentucky Chamber of Commerce, Louisville, in a projection of Kentucky's industrial future, declared that prosperity in the state depends upon a continued high-level production of coal. Since 1949 505 new plants have located in Kentucky. These employ 77,071 people with an annual payroll of \$236,166,000.

Furthermore, it is evident that business men are willing to bet more, in the form of increased investments, that the business boom will continue in the years ahead, Mr. Gattton said. Kentucky C. of C. is active in promoting industrial tours among out-of-state executives.

Taking up the importance of industrial engineering as applied to coal production, E. E. McBurney, general manager, Jewell Ridge Coal Corp., Tazewell, Va., said that the need for such studies in coal were as urgent as late as 1935 as they were in the manufacturing industries in the 1890's. Increases in mechanization, however, forced the recognition as a necessity of scientific management methods, Mr. McBurney said.

The functions of a good industrial engineering set-up include:

1. Time and operation analysis is used

as a basis for developing standard practices, to determine sources of waste and to determine optimum crew size.

2. Performance-standards analyses are used as indexes of measurement.

3. Standard costs and budgets should be prepared to measure and control production costs.

4. Bonus plans for supervisors may be desirable if the plans are understandable and impartial and if such plans include factors which supervisors can control.

Other functions include salary administration, wage incentives, maintenance programs and training. The objective is cost reduction.

To make an industrial engineering program successful, the head of the department should be thoroughly trained, all echelons of management must be open-minded to changes, top management must give its full support and the staff should be made up of carefully selected industrial engineers, Mr. McBurney said.

On the subject of recent developments, O. E. May, vice president, Paradise Coal Co., Drakesboro, Ky., took special note of mergers and consolidations, the trend to water transportation, better overburden drilling and lower cost blasting agents, wheel excavators and giant shovels and the economies inherent in storage of raw coal and prepared coal. Mr. May also noted a trend toward designing cleaning plants for the production of steam coal, thus reducing the cost of preparing a number of sizes.

On specifics, Mr. May reported the development of special loading-shovel buckets at River Queen mine in western Kentucky where coal from an upper seam will be loaded into trucks running on the coal of a lower seam. This requires a bucket that will discharge below the base of the shovel and load in the conventional manner.

Paradise now is planning recovery of three seams in which the lower seams will be uncovered and loaded out by draglines. It will be necessary to re-handle up to 30% of the overburden economically to make the method successful, Mr. May said.

Closing paper of the 2-day meeting was a brief description of nine fires, four explosions and one gas ignition in Kentucky mines since the 1955 meeting of K. M. I., by Mr. Phalan. Two men died as a result of these accidents and several were injured.

At a business session conducted by retiring institute president H. E. Knight, chief engineer, W. G. Duncan Coal Co., Madisonville, officers for 1956-57 were elected as follows:

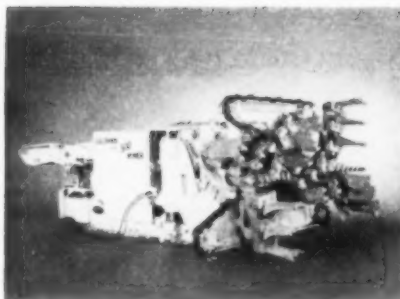
President—Frank Smith, assistant general superintendent, West Kentucky Coal Co., Madisonville, Ky.

First vice president—E. F. Milen, retired, Hardy, Ky.

Second vice president—Norman Yarbrough, division engineer, U. S. Steel Corp., Lynch, Ky.

Third vice president—B. F. Reed, president, Turner Elkhorn Coal Corp., Drift, Ky.

Secretary-treasurer—James Phalan, chief, Kentucky Dept. of Mines and Minerals.

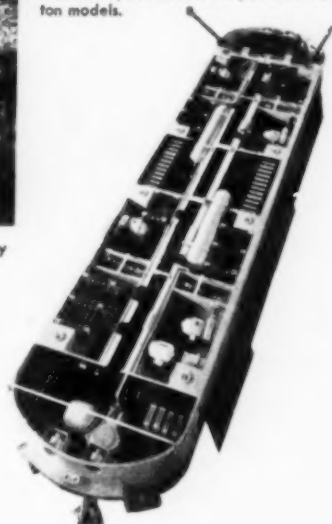


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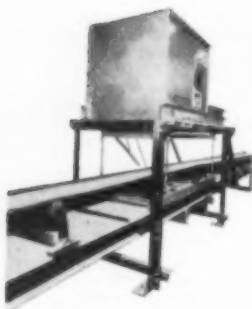
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## SCPA Review (from p 90)

will have to be found for a good deal of the oil which formerly went to the Free World from the Middle East. What does this mean to coal? It is possible it would help but it could hurt. Oil tankers might be built to carry oil to Europe at the expense of coal capacity. The association has brought this to the attention of the administration and has been assured that coal will not be overlooked.

High freight rates have plagued the industry for some time and led to the formation of American Coal Shipping, Inc., which resulted in some decline. Rates have risen since the Middle East outbreak, but the rise may not affect the market. Other problems to be worked out include better facilities for handling coal overseas, satisfactory credit arrangements, high insurance rates, and lack of studies to turn up possible opportunities elsewhere in the world.—Mr. Moody.

**Wages and Costs—Productivity** in the South was 4.52 tons per man-day in 1942 and 9.5 in the most recent year for which data are available. Why not a corresponding drop in production cost? The answer is ever-increasing wage rates, up 388.6% since Jan. 1, 1941. Meanwhile, coal prices have gone up only 166%. "In other words, as the operator has made large investments to more economically mine coal and improve efficiency, labor has captured all and more of the savings brought about by mechanized mining and other refine-

ments."—Mr. Thurmond.

"You know as well as I that the higher costs have been offset to a considerable extent by the mechanization of mines and the resultant higher productivity per man. . . . The mergers in the coal industry are, to a considerable degree, forced by the need for sizable accumulations of capital which, in turn, are necessitated by the heavy expense of mechanization. The merger trend will continue, since there is little prospect for reduced costs of transportation, labor and supplies in the foreseeable future.

"A question which has not been answered is to what extent any future higher costs can be offset by increased productivity. . . . Undoubtedly the machines of the future will be somewhat more efficient than those in use today but, undoubtedly also, they will cost a good deal more. Also, strip mining, which is relatively cheap, is probably at its maximum production level."—Mr. Moody.

**Collective Bargaining**—"For 6 yr now industry's wage agreements have been negotiated without nationwide strikes. A few men have done the negotiating; most of the industry has stood by and waited for the news. I am not saying that the agreements have not been arrived at through bargaining but certainly it is a new form of collective bargaining, if that is what it is. . . . This new pattern in wage negotiating could have a most significant effect upon our future."—Mr. Moody.

"You are as well aware as I of some of the implications in negotiations which involve a very few men and which may or may not take into account situations and factors affecting many elements of the bituminous coal industry. I think the Southern Coal Producers' board did a very wise thing when it authorized the president to name a committee to go into this matter thoroughly and report its findings, with recommendations."—Mr. Thurmond.

**Competitive Fuels**—"Competition continues to become more acute in the struggle between solid fuels and the so-called laborless fuels (oil and gas) for the energy markets of the country. The Southern Association has put forth its best and constant efforts before various legislative committees and federal commissions to obtain legislative rulings that would slow down the avalanches of oil and gas pouring into our markets—for- eign oil from Venezuela and the Middle East; gas from the Southwest and Mexico and Canada. This has been without the success hoped to be attained."—Mr. Thurmond.

"If coal is to be competitive with other sources of power, coal's share of the market may equal predictions. But coal will be competitive with other sources of power only if our industry works intelligently to keep it so. Mechanization, more-efficient sales efforts and other steps to offset rising costs are not enough. We must have more influence with government in the future than we have had in the past." In addition to oil and gas competition there is the question of coal's allowance for tax depreciation, TVA

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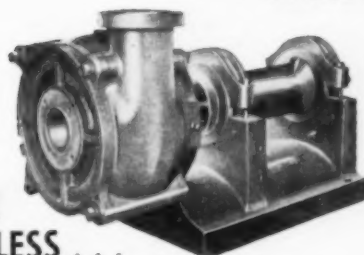
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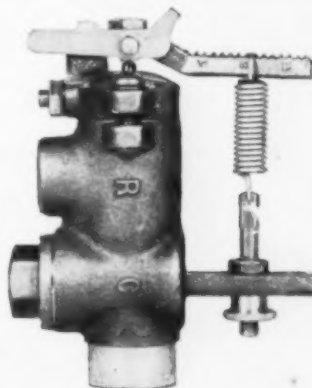
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## SCPA Review (from p 90)

coal-buying practices, and the campaign of the public power advocates aimed at putting the government into the generation of electricity from nuclear power in addition to hydro power.

"It is evident from what I have said today that many of our pressing problems are definitely affected by government. . . . Government, as such, is not mimical to our industry. But, if we do not mend our government fences and keep them mended, we are always going to be complaining about discrimination."

—Mr. Moody.

**Freight Rates**—"There is some indication that the railroads feel that freight rate on coal is about as high as the traffic will stand, and that they will deal more temperately with the coal industry in the future."—Mr. Thurmond.

"The increase in ocean freight rates is not the only transportation cost which hampers the Southern coal industry. . . . In the past 10 yr railroad freight rises have been heavier on bituminous coal than almost any other product. Undoubtedly the railroads know their business and they think they know what the traffic will bear. Nevertheless, the ever-increasing cost of rail transportation is causing shifts in the transportation pattern for coal."—Mr. Moody.

**The Future**—"Most of us feel right now that the bituminous coal industry is doing all right but, in part, that is only because we are well off compared to the tailspin we were in back in 1953 and 1954. If we will stop to think a moment, we will realize that coal has been a feast or famine industry. Over the years, most other important industries have made far more profit per sales dollar than coal, and in many instances coal lost money when other industries were in the black. For the future, the coal industry should make more money per sales dollar and make it consistently."—Mr. Moody.

**Safety**—In a question-and-answer session preceded by an outline of some of the activities of the U. S. Bureau of Mines in the minerals production and utilization fields, Marling J. Ankeny, director, contributed the following on coal-mine safety at the second business session, with Mr. Goldsmith presiding.

Public Law 532 was not drawn up in the best-possible form but nevertheless has contributed materially to reducing disasters. The last major explosion, for example, occurred Nov. 28, 1954. The problem of eliminating or neutralizing the causes remains to be solved before the hazard of major explosions can be completely eliminated. On the question of interpretations, the procedure in the future will be for a committee of representatives of BCOA, SCPA, NCA, UMWA and USBM to review after which they will be published in the *Federal Register*.

Future bureau pronouncements and recommendations on safety developments will not be handled through press re-



**LUNCHEON SPEAKER** and officials of Southern Coal Producers Association. Patrick C. Graney (left), Mount Hope, W. Va., vice-president, Sterling Smokeless Coal Co.; Henry F. Warden, Bluefield, W. Va., president of American Coal Co. and chairman of SCPA executive committee; Richard L. Wilson, chief of Washington, D. C., Bureau, Cowles Publications; and Joseph E. Moody, Washington, D. C., president of SCPA.



**BUREAU OF MINES DIRECTOR** Marling J. Ankeny addresses afternoon session of Southern Coal Producers Association convention in Huntington, W. Va. W. W. Goldsmith (seated), president, Floyd County Coal Corp., was chairman of afternoon session.

leases alone but also by circulation through the advisory committee members directly to the industry.

The rule against sending inspectors only to areas where they had not been worked has been abandoned. When the industry believes an inspector is being arbitrary and unreasonable, it should report him, since inspectors are expected to conduct themselves so that such incidents will not occur.

On spot inspections and consequent interference, the act requires "continuous compliance," and inspectors must take reasonable steps to that end. However, the

operator is entitled to an immediate report, either oral or written, the same as with a regular inspection.

On advance notice, the UMWA is against.

On conditions noted as violations in last inspection but not before, the hope is to improve the quality of the inspection to eliminate.

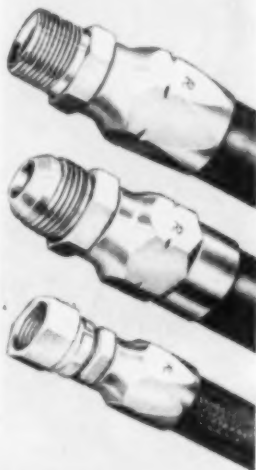
Excessive length of inspection—no known answer at present time.

Closing, Mr. Ankeny asked for the cooperation of the industry and in return pledged the maximum improvement in the quality of the service.

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*Registered Professional Engineers*  
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CLASSIFIED

**SEARCHLIGHT SECTION**

ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

**UNDISPLAYED RATE:**

\$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

**POSITION WANTED** undisplayed advertising rate is one-half of the above rate payable in advance.

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The advertising rate is \$12.50 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

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Send New Advertisements or Inquiries to Classified Advertising Div. of Coal Age, P. O. Box 12, New York 36, for January issue closing Dec. 17

Replies (Box No.): Address to office nearest you  
%/. This publication Classified Adv. Div.  
NEW YORK: P. O. Box 12 (36)  
CHICAGO: 520 N. Michigan Ave. (11)  
SAN FRANCISCO: 69 Post St. (4)

**POSITION VACANT**

**Engineer to fill vacancy in Engineering Dept.** of large coal mining operation. Must be qualified for underground and surface surveying, mapping and general drafting work. Apply: Inland Steel Company, Wheelwright, Kentucky.

**POSITION WANTED**

**Coal Inspector 20 years experience in Pennsylvania, Maryland, W. Va.** with progressive New York and Philadelphia Brokers. PW-3542, Coal Age.

### Proven **COST REDUCTION PROGRAMS**

for the Coal Industry

HELMICK & ASSOCIATES

9619 LAKE SHORE BLVD. CLEVELAND, OHIO

**2 TELEPHONES \$22.75**

Inter-communicating handsets, two wire system. Included Two 3 volt batteries, 50 ft. of wire and simple wiring instructions. Additional wire 1 cent per ft. or \$25.00 per mile. Complete list of telephone parts, handsets, magnets—common battery — and dial telephones, switchboards, etc. All shipments FOB Simpson, Penna.

Telephone Engineering Co., Dept. 12CA6, Simpson, Pa.

**YOU ARE ONE**

of close to 14,000 readers of **COAL AGE**.

Your problems of mine management, production and maintenance—business or individual—are duplicated with *other* readers **BUT—**

Still **OTHER** readers can provide the solution of your problem if they *know what it is!*

Tell them! Here! Through classified advertising in the Searchlight Section of "Coal Age"—your business paper and *theirs*.

**FOR SALE—Coal Mining Machinery**

If you are interested in miscellaneous second hand coal mining machinery including pumps, hoists and electrical equipment, write or call L. S. Myers, Purchasing Agent, Northern Pacific Railway Company, King Street Passenger Station, Seattle, Wash.

W. K. Smallridge, Director of Purchases  
Northern Pacific Railway Company, St. Paul, Minn.

**STRIPPER**

A deep mine coal operator with large holdings desires contact with experienced strip mining organization. Must have equipment suitable for production of large tonnage in hilly terrain.

BO-3621 Coal Age

Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

**FOR SALE:  
STRIP MINE**

Going operation. Equipment, acreage and tipple. Government contract. Located Southern Tennessee. Reason for selling, other interests. Includes 8 yard Page dragline, 2 yard Lorain doisel loading shovel, 2 D8 Dozer, Cat 12 Grader, D4 Dozer, complete tipple, bins and ramp, crusher, car puller, 40 car railway siding, 100 KW diesel electric power plant. Large coal acreage, trucks, pumps, tools, shops, tipple office, misc. parts, etc. One (1) year coal contract.

Also have real estate for administrative personnel, a modern house and two (2) guest houses on main highway located on 8 acres of land. Principals only. For further details reply

FS-3282, COAL AGE

520 N. Michigan Ave., Chicago 11, Ill.

**FOR SALE**

Peerless Brand New Submersible Pumps  
250 GPM at 47 foot head, Brass construction with 75 foot cable, check valve, strainer and controller. Outlet for 2½" Hose. 4 H.P.—230 Volt DC. Dimension—9" Diameter x 29" long. Government Cost \$991.00 ea.

Price—\$125.00 ea. F. O. B. West Trenton or Ogden, Utah

FRANKLIN MACHINE PRODUCTS CO., INC.  
WEST TRENTON, NEW JERSEY

**WANTED  
SHOVELS AND  
DRAGLINES**

To be from very large to small machines

**EUCLID TRUCKS**

Need all sizes — rear dump trucks.

Please advise price, serial numbers, mechanical condition and other pertinent information.

We pay cash for your equipment.

FRANK SWABB EQUIPMENT CO., INC.

313 Hazleton Nat'l. Bank Bldg.  
Hazleton, Pa. Gladstone 3-3658

### We have inquiries for equipment **WANTED**

75 kw MG set, 250v  
20" gauge mining cars  
30" gauge mining cars  
12½ shakers, ac  
G15 shakers, dc  
88U, 250v dc  
88U, 500v dc  
128U, 250v dc  
And others

Try our information center

BRIGHT DAY SERVICES, INC.

Reynolds Bldg., Kittanning, Pa.

# MINING EQUIPMENT FOR SALE

## TRACKLESS EQUIPMENT

- (C) 1—32E7 Joy Shuttle Car
- (C&W) 4—43D Joy Shuttle Cars
- (C) 1—Lee Nerve Shuttle Car
- (C) 1—72.5 Joy Cat Truck
- (C) 1—12BU 9E Joy Loader
- (C) 1—8BU As Is or Rebuilt, 500 Volt
- (C) 2—8BU As Is or Rebuilt, 250 Volt
- (W) 1—8BU 116, 220/440 V. AC
- (W) 2—Baker Battery Supply Tractors, Permissible
- (C) 1—124 Goodman Cutter, Rubber Mounted
- (C) 1—29U Jeffrey, Rubber Mtd.
- (C) 1—PL11-5E Joy Elevator
- (C) 1—PL11-7E Joy Elevator
- (C) 2—PL11-8E Joy Elevators
- (W) 4—40 H.P. Acme Self Propelled Air Compressor-Perm.
- (C) 1—14BU 3PE Joy Loader

## CONVEYORS

- (W) 1—32B 26" Jeffrey Conveyor, 900' Center to Center
- (W) 2—35A 24" Goodman Conveyors, Approximately 500'
- (C) 1—MTB 26" Joy Conveyor, 1000' Centers, Less Belt
- (C&W) 8—61AM Jeffrey Room Chain Conveyors
- (W) 3—61HG Jeffrey Face Chain Conveyors
- (W) 2—61EW Jeffrey Elevating Chain Conveyors
- (C&W) 4—61W Jeffrey 15" Gathering Chain Conveyors
- (W) 4—15" Joy Chain Conveyors, Permissible
- (C) 2—20C Joy Chain Conveyors
- (W) 6—61G Goodman Shaker Conv.
- (C&W) 6—612" Goodman Shaker Conv.
- (W) 1—PT12 Long Piggyback Conv.
- (W) 32—Goodman Power Duckbills, Model 477, 61 1/2"

## CUTTING MACHINES

- (W) 4—2B Sullivans
- (C&W) 4—7AU Track Mtd. Sullivans
- (W) 6—11B Sullivans, Both 35 & 50 H.P.
- (W) 1—20C Joy Chain Conveyors
- (C) 1—29U Jeffrey 220/440 Volt, 42" T. G.—Excellent

- (C) 1—35L Jeffrey
- (C&W) 15—35B & 35BB Jeffreys, As Is or Rebuilt
- (C) 6—12AB Standard Goodman, 35 H.P.
- (C&W) 4—12AA Standard Goodman, 50 H.P.
- (W) 1—212AA Baby Goodman
- (W) 1—312 G3, 220/440 V. AC Goodman, Rebuilt
- (C) 2—412 CA Goodmans
- (W) 4—512 DA Goodmans
- (C) 2—712 Goodmans
- (C) 1—823 Goodman, 42" T. G.
- (C) 1—1224 Goodman, Rubber Mtd.
- (C) 1—Lot Machine Trucks for Jeffrey & Goodman

## LOCOMOTIVES

- (W) 1—4 Ton Ironton, 42" T. G., Completely Rebuilt—25 1/2" High
- (C) 1—MH12 Jeffrey
- (C) 1—MH8 Jeffrey
- (W) 3—MH8B Jeffreys
- (C) 1—MH150 Jeffrey, 42" T. G.
- (C) 2—MH110 Jeffreys, 42" T. G.
- (C&W) 4—MH100 Jeffreys, 36" T. G.
- (W) 5—MH803 G.E., 36", 42" or 44" T. G.
- (W) 5—MH823 G.E., 42" T. G.
- (W) 1—6-30 Goodman, 4 Ton, 25" High w/ T. G.
- (C&W) 3—314T Goodmans, 6 Ton
- (W) 1—8 Ton Goodman
- (C&W) 2—304 West, 6 Ton Locomotive
- (W) 1—6 Ton, G.E., Battery Locomotive, with Batteries—All New

## MINE CARS

- (W) 16—42" T. G. End Dump, 19" High
- (W) 50—36" T. G. ACF Drop Bottoms, Cheap
- (W) 13—36" T. G. Sanford Dry, Drop Bottoms
- (C) 14—42" T. G. End Dump, Wood
- (W) 50—44" T. G. End Dump, 3 Ton, All Steel Excellent
- (W) 75—44" T. G. End Dump, 2 1/2 Ton Composite Cars—Enterprise
- (W) 65—44" T. G. End Dump, 2 Ton, Enterprise
- (C&W) 2—Composite
- (W) 160—44" T. G., E.D., 1 1/2 Ton, 23" High, Composite

## SUBSTATIONS

- (C) 1—100KW, GE Motor Generator Set
- (W) 1—200KW West. Rotary, 1200RPM 2300/4000 V. AC, 275 DC, Automatic Breakers
- (C) 1—200 KW HCCB, GE Rotary, 2300/4000 V. 275 DC
- (W) 1—150KW West. MG Set, 1200RPM 2200 Volt, 275 DC
- (W) 1—150 KW GE MG Set, 1200RPM, 2200 Volt, 275 DC
- (C) 1—150KW West. MG Set, 200 Volt

## MISCELLANEOUS

- (W) 1—3-Track, All Steel Tipples, Located at Insull, Kentucky
- (C&W) 8—MKL Brown Fayre Car Spotting Hoist
- (C) 1—Nolan Automatic Car Spotter
- (C&W) 12—Hoist, 5 to 100 H. P.
- (C) 1—MKM Brown Fayre Car Spotting Hoist
- (C) 1—25 H. P. Double Drum Hoist
- (C) 1—15 H. P. Car Spotting Hoist 220/440 Volt
- 2—Sets Mine Track Scales
- (W) 2—Crossover Dumps—New & Used
- (C&W) 16—Coal Drills A7, 56A, 571 & 572, AC & DC
- 1—Truck Bed for Stoker Coal—New
- (W) 1—Armos Prefab Steel Building—130' Long
- (W) 1—5' Morrow Shaker
- (C) 1—42" Loading Boom, 32' Long
- (W) 1—42" Loading Boom
- (W) 1—18" Belt Conveyor for 30' to 150'
- (W) 1—40" Morrow Scraper Conveyor 250' Long
- 1—D4 Caterpillar Dozer
- (C) 1—42" x 38" Jeffrey Flex Tooth Crusher
- (W) 1—MSA Bantam Duster
- 2—American Mine Door Rock Dusters
- (C) 1—50 H. P. MSA Rock Duster—Permissible
- (C) 1—5' x 10' Double Deck Screen
- (C) 1—6' Aerodyne Fan
- (C) 1—210 Cu. Ft. Schramm Air Compressor
- (C) 1—100 Cu. Ft. Acme Air Compressor—Track Mtd.
- (C) 1—Winslow Truck Scale
- 1—Howis Truck Scales
- (C) 2—ITE Automatic Circuit Breakers
- (C) 6—24 J & 382 Joy Motors—Locomotive or Shuttle Cars
- (C&W) 5—Battery Chargers
- (C&W) 10—Pumps, All Types

# ELECTRIC & MACHINE SUPPLY COMPANY

## MINING & INDUSTRIAL EQUIPMENT

Whitesburg, Kentucky  
P.O. Box 610—Phone 2590 or 2594  
(W) Denotes equipment located at Whitesburg, Kentucky  
**BILL CONLEY**

Clarksburg, West Virginia  
P. O. Box 227 — Phone 3-0253  
(C) Denotes equipment located at Clarksburg, West Va.  
**MELVIN ADAMS**  
**H. J. (HANK) UBBING**

Please Direct Your Inquiries to Proper Location for Prompt Quotation — ALL INQUIRIES APPRECIATED

## REBUILT LOCOMOTIVES

- 4—20-ton late type Westinghouse 940-C; 125 H.P. ballbearing motors, air brakes, sanders, double and contactor controls, 48" to 42" gauge.
- 2—20-ton Jeffrey MH-77, Practically new.
- 4—15-ton Jeffrey MH-118
- 3—15-ton Jeffrey MH-118
- 2—15-ton Goodman 36A-94C
- 1—13-ton Goodman 36B-94C
- 4—10-ton Goodman 34B-94C
- 1—10-ton Jeffrey MH-143
- 1—10-ton Westinghouse 927-LD
- 7—8-ton Goodman 32-94T

Above Locomotives are all 250 V DC. Track gauges run from 36" to 56 1/2".

## SUBSTATIONS

- 3—300 KW G.E. Rotary Converters, Type HCC-6, Perm P, 1200, 230/275 V, complete with switchboards, switchgear, 1800 amp, I-T-E automatic reclosing circuit breakers.
- 3—200 KW G.E. Rotary Converters, Type HCC-6, Perm P, 1200, 230/275 V, complete with switchboards, switchgear, 1200 amp, I-T-E automatic reclosing circuit breakers.

All types of single and double drum Hoists for all purposes.  
Loading and Cutting Machines, Shuttle Cars, Steel Mine Cars—all gauges.  
Mine Fans and 4- and 5-track Steel Tipples.

Above converters are equipped with three single phase, 60 cycle transformers, 2300/4000 V AC.  
3—300 KW Westinghouse M.G. Sets, 250/275 V, 3 phase, 60 cycle, 2200 V, 1200 speed, complete with switchboards and all necessary switchgear.  
2—200 KW G.E. M. G. Sets, 250/275 V, 1200, 2300 V AC, complete with switchboards and all necessary switchgear.  
1—500 KW Westinghouse M.G. Set, 250/275 V, 1200 RPM, 3 phase, 60 cycle, 2300 V, complete with all necessary switchgear and switchboards.

## MISCELLANEOUS

- 5—14BU-3PME Joy Loaders, 4400 series, Good operating condition
- 5—29U Jeffrey Cutting Machines, late type, permissible
- 3—650-BH Goodman Loading Machines, full hydraulic, 250 V, late type, permissible.
- 4—42-18 Joy Shuttle Cars
- 2—5-SC Joy Shuttle Cars
- 1—Jeffrey 6' Aerodyne Fan complete with 125 HP motor
- 1—Marietta Continuous Miner, No. 5325, used less than five shifts, 250 V, permissible.

## WILL BUY

Several Single and Double Drum Hoists from 300 HP to 1000 HP with 2300 V or 440 V motors and controls. Mail us complete specifications on any Hoists you have to sell. Will pay spot cash for them.

Wanted: Will pay spot cash for 14-BU, 8-BU and 11-BU Joy Loading Machines; 5-SC and 6-SC Shuttle Cars.

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

# COAL MINE EQUIPMENT SALES COMPANY

FRANK J. WOLFE      PHONE L.D. 34      SHELDON J. WOLFE  
TERRE HAUTE, INDIANA

## REPLACEMENT PARTS!

• ALLIS CHALMERS  
• INTERNATIONAL  
• CATERPILLAR  
(New, Used, Rebuilt)



## GENERAL

MACHINERY CORPORATION  
355 NORTSIDE DRIVE  
ATLANTA 18, GA.  
U.S.A.

WRITE TODAY FOR FREE GIANT LIST: USED EQUIPMENT, ATTACHMENTS AND PARTS. Tremendous Savings. All Inquiries Invited

## NEW and REBUILT STORAGE BATTERY

# LOCOMOTIVES

1 1/2 to 10 Tons 18" to 56 1/2" Track Gauge.  
GREENBURG MACHINE CO.  
Greenburg, Pa.

## RELAYING RAIL

All Sizes  
Track Accessories

## LEFTON INDUSTRIAL CORP.

General Office: 212 Victor Street  
St. Louis 4, Missouri

**RAILS**  
MIDWEST STEEL CORP.  
550 DRYDEN ST., CHARLESTON, W.VA.

## MOTORS • GENERATORS TRANSFORMERS

NEW • REBUILT  
WORLD'S LARGEST  
INVENTORY

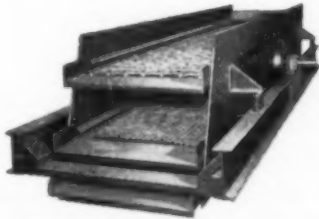
ELECTRIC EQUIPMENT CO.  
Phone Station Collect GL 3-6783  
P. O. Box 51 Rochester, New York



# BONDED EQUIPMENT BARGAINS

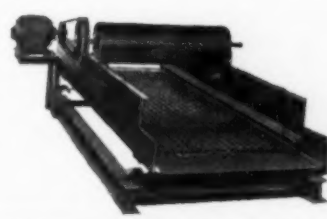
IMMEDIATE SHIPMENT FROM OUR FACTORY—WRITE, WIRE OR PHONE

## NEW BONDED® HEAVY DUTY VIBRATING SCREENS



Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	\$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
138AS	3' x 8'	1	675
238AS	3' x 8'	2	815
338AS	3' x 8'	3	996
138BS	3' x 8'	1	1231
238BS	3' x 8'	2	1282
338BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1953
3410BS	4' x 10'	3	2305
3412BS	4' x 12'	3	2635

## NEW BONDED® GENERAL DUTY VIBRATING SCREENS



For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. **HEAVY DUTY MODELS, TYPE BS:** 4-bearing positive throw, eccentric shaft; 3' x 8' to 5' x 14', 1 to 5 decks. **GENERAL DUTY SCREENS, TYPE AS:** eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for new 8-page Bulletin 1086 and 1087.

## NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take your loss on our stock of short length belting. You can save as much as 50% on the **BONDED CONVEYOR SPECIALS** listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2 1/4 or 3-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1 1/2" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember,  
You Save  
Up To  
50%



### CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	\$1397	\$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

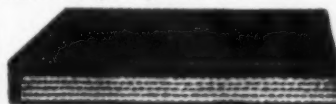
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting.

For 14" belt	\$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Write For Bulletin #1138

## NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck 1 1/2" top rubber cover by 1/32" bottom cover 12 1/2 to 15 1/2 average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	List Price	Sale Price
14" .....	\$3.43 foot	\$2.75 foot
16" .....	3.96 foot	2.88 foot
18" .....	4.27 foot	3.19 foot
20" .....	4.69 foot	3.69 foot
24" .....	5.55 foot	4.14 foot
30" .....	6.77 foot	5.06 foot
36" .....	8.01 foot	6.00 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1 1/2" top rubber cover x 1/32" bottom cover, 16 1/2 to 19 1/2 average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe services, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

16"	4	\$4.59 foot	\$3.36 foot
18"	4	5.09 foot	3.72 foot
20"	4	5.57 foot	4.24 foot
24"	4	6.56 foot	4.80 foot
30"	4	8.05 foot	5.89 foot
24"	5	7.68 foot	5.61 foot

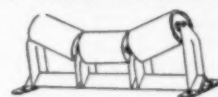
Additional widths and plies available at low prices. Write for Free Sample.

## NEW BONDED® FEEDERS



For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded® Troughing Idler Conveyors, thus eliminating the necessity of two motors. Capacities to 225 tons per hour. Full information in Bulletin #1140. Write for it. Priced from ..... \$255.00

## NEW IDLERS AND RETURN ROLLS 28% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:

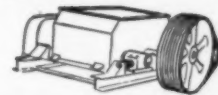
14" belt	\$18.50	24" belt	\$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	\$7.25	24" belt	\$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greaseable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Also available with grease pipe extensions. Write for prices. Write for bulletin # 1138.

## NEW BONDED® COAL CRUSHERS



Capacities from 50 to 500 tons per hour. Will crush to all sizes from stoker to 8". Take feed sizes to 24". Teeth designed to break coal sharp and clean with accurate sizing and minimum of fines. Double roll crushers with single and double drive; also single roll crushers. Hard cast rolls and gear, spring safety for tramp iron protection. Same model with corrugated and smooth rolls for cinders, chemicals, ag-lime, shells, etc. Complete with welded steel hoppers.

Priced from ..... \$527.00

## NEW BONDED® FLIGHT CONVEYORS



Bonded Flight Conveyors are made in portable and stationary models. Any length. Flight sizes up to 8" x 24". Made of welded structural and sheet steel with heavy duty double guided chain. For use up to 45° angle.

Priced from ..... \$463.00

YOU ARE WELCOME TO VISIT THE BONDED FACTORY ANY TIME

## BONDED SCALE AND MACHINE COMPANY

PHONE: Hickory 4-2186 Days;  
2190 S. Third St.

WRITE FOR FREE CATALOG AND PRICES

PHONE: AXminster 1-2213, Evenings  
Crushers and Feeders Columbus 7, Ohio

## SHOVELS—DRAGLINES DRILLS CRANES—EUGLIDS

9-W Bucyrus Erie Drag, 165' 10 yd.  
625 Page Diesel Drag, 160', 10 yd.  
6160 Bucyrus Monaghan Elec. Drag, 160', 8 yd.  
621-S Page Diesel Drag, 125', 7½ yd.  
200-W Bucyrus Monaghan Drag, 125', 6 yd.  
2400 Lima Drag, 110', 6 yd.  
7200 Marion Diesel Drag, 135'  
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.  
5-W Bucyrus Erie Drag, 120', 5 yd.  
4500 Manitowoc Drag, 120', 5 yd.  
1055 P&H Drag, 90', 3½ & 4 yd.  
1201 Lima Drag, 85', 3 yd.  
54-B Bucyrus Erie Comb. Crane & Drag  
802 Lima Cranes  
3500 Manitowoc 60 ton Crane  
3500 Manitowoc Drag, 80', 2½ yd.  
955 P&H Drag, 90', 2½ yd.  
903 Osgood Drag, 70', 2 yd.  
5480 Marion Elec. 15 yd. Shovel  
170-B Bucyrus Erie Elec. 6½ yd. Shovel  
1600 P&H 6 yard Shovel  
2400 Lima Standard 6 yard Shovel  
1708 Bucyrus Erie Elec. 6½ yd. Shovel  
4500 Manitowoc 4 yd. H. L. Shovel  
1201 Lima Standard 3½ yd. Shovel  
1201 Lima 2½ yd. H. L. Shovel  
3500 Manitowoc 2 yd. H. L. Shovel  
3000-B Manitowoc 2 yd. Shovel  
820 Lorain 2 yard Shovel  
803 Lima 1¼ yd. H. L. Shovel  
Unit 1020 ¾ yd. Shovel—1 Yr. Old  
600 Reich Heavy Truck Mounted Rotary Air Drills (Both Lever Arm and High Mast)  
Davey Rotary Truck Mounted Air Drills  
Mayhew Rotary Truck Mounted Air Drills  
58-BK Joy Champion Rotary Air Drills  
42-T, 29-T and 27-T Well Drills  
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Eucild Trucks—27FD, 18FD, 8TD, 36FD, 82FD, 13TD, 14TD, 63TD—Bottom & Rear Dumps.

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### 40# RAIL 150 TONS

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100 Sanford-Day all steel solid bottom cars  
38" T.O.—145.3 c.f. water level—13'-0" overall length—  
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1 Rotary single car dump for above cars.  
All practically new condition.

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### Mine Supplies

1 Spool Wire Rope, New, ¾ in. 4,300' Roebling Lang Lay, one piece.

### Loading Equipment

2 14BU3PE Joy Loading Machines in good working condition. One equipped with 24J Motors.

### Locomotive

1 807 G. E. 8 T Locomotive, with MB37 Jeffrey Controller, 2 Series Fields and extra Armature, 48 in. Track Gauge.

### Mine Cars

25 Sanford Day Drop Bottom cars 48" T.G., 21" above rail, 70 cu. ft. capacity.

19 Sanford Day Drop Bottom cars 48" T.G., 20" above rail, 67 cu. ft. capacity.

### Mine Phones

8 Mine Safety Appliance Trolley Phones complete with extra transmitter and receiver.

### Mine Scales

2 Sets Bond Mine Scales 8' x 13' deck. One has Streeter Amet recorder.

### Hoists

1 Lidgerwood Hoist, 125 HP, Spools 5,000' of ¾" rope, Single Drum. Rope speed 400' per min.

1 Shepard Hoist, 100 HP, Spools 2,000' of ¾" rope.

1 8 foot Tandem Incline Drum. Grooved for 1¼" rope. Used less than 3 years. Brakes and bearings in A-1 condition.

**ALL OF THIS EQUIPMENT IS IN GOOD WORKING CONDITION  
INSPECTION MAY BE MADE AT OUR CLOSPINT MINE. PRICES ARE OPEN  
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Coal Company mine and tippie.

Complete 4-Track Link Belt Tippie includes:

1—Jeffrey Jig Washer  
1—Roberts and Schaefer super Air Flow Table  
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Viking hot-oil Treating Equipment, Heaters, Oil  
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4 Loading Booms  
10 Conveyors  
Crushers  
100 tons 30" and 40" Rail  
10,000 Ft. 4/0 Trolley Wire  
5 Rotary Converters 100 to 250 KW  
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10 Mine Locomotives, 4 to 10 tons.  
100 Mine Cars  
2 Jeffrey 35-L Machines  
2 Jeffrey 35-B and 35BB Machines  
2 Baby Goodman 212 Cutting Machines  
3 Air Compressors on Mine Car-Trucks.  
Goodman Shaker Conveyors.  
Joy 8-BU Loading Machines  
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We Own What We Advertise.—Buy from the largest stock of good mining equipment in America. Includes all types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc.

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- 1—Joy 14-BU Loaders, high pedestal.
- 3—Joy 12-BU Loaders, 9E, latest type.
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- 2—Joy 8-BU Loaders 34" overall.
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- 4—Joy 32E15 Shuttle Cars.
- 2—Joy 32E16 Shuttle Cars.
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- 1—Joy T-2-5 Cat Truck, AC.
- 1—Joy T-2-6 Cat Truck with reel.
- 4—Joy 11-B Cutting Machines, like new.
- 1—Joy 7-B Cutting Machines, like new.
- 2—Goodman 512 Cutting Machines with Bugdusters.
- 4—Goodman Machines on Cais, 31" high. All hydraulic.
- 1—Goodman 512 Cutting Machine, perfect.

## LOCOMOTIVES

- 2—Jeffrey, 20 ton, type MH-110, 42" and 44" Ga.
- 4—Jeffrey, 13 ton, type MH-110, 36", 42" and 44" Ga.
- 3—Jeffrey, 10 ton, type MH-78, 42" and 48" Ga.
- 12—Jeffrey, 6 ton, type MH-68, 42", 44" and 48" Ga.
- 3—Jeffrey, 4 ton, type MH-66, 42", 44" and 48" Ga.
- 1—G. E., 4 ton, type 825 Locomotive, 26" high.
- 1—G. E., 6 ton, types 901, 903, 821 Locomotives, 42", 44" and 48" Ga.
- 1—G. E., 8 ton, type 822 Locomotive, 44" Ga.
- 3—G. E., 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
- 1—G. E., 10 ton, 829 Locomotive, 36" Ga.
- 1—Goodman, 4 ton, 8-30 Locomotive, 22" above rail.
- 1—Goodman 6 ton Locomotive, 26" high.
- 8—Goodman, type 33, 6 ton, 44" and 48" Ga.

- 3—Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
- 3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
- 2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
- 2—Westinghouse type 906, 44" and 48" Ga.
- 2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.

## TIPPLE EQUIPMENT

- 1—Cedar Rapids portable super Screening Plant.
- 1—Atlas-Chalmers 5' x 14' Rippa Vibrator.
- 1—4' x 10' Robbins Gyrex Vibrator.
- 1—4' x 14' Vibrator, three deck, low head.

Feeders, Drag Conveyors and Loading Booms.

## CUTTING MACHINES

- 2—Jeffrey 29-UC Universal on cats.
- 1—Goodman 312-G-3, 220 AC low vein.
- 4—Baby Goodman 212's, rebuilt.
- 3—Goodman 312's, 18" high.
- 2—Goodman 312's with Bugdusters, like new.
- 13—Goodman 12AA's and 12AA's.
- 10—Goodman 324 Slabbers.
- 2—Goodman 724 Slabbers.
- 30—Jeffrey 351's, like new, 17" high.
- 13—Jeffrey 35B's and 35BB's.
- 2—Jeffrey 29B's on track.
- 2—Jeffrey 29C's, track mounted.
- 2—Jeffrey 29L's on track, perfect.
- 2—Sullivan CR-10's, 15" high.

## LOADING MACHINES

- 17—Joy Loaders, all types.
- 2—Jeffrey 61 CLR's on rubber, 26".
- 3—Jeffrey L-500 Loaders.
- 2—Myers Whaley No. 3 Automat Loaders.
- 3—Clarkson Loaders, 26" above rail.

## CONVEYORS

- 2—Joy 30" Belt Conveyors, 10 to 15 H. P.
- 2—Goodman 97-C's, 26".
- 3000' 30" Conveyor Belt.
- 8—Jeffrey 61 AM Room Conveyors, 300 ft.
- 10—Jeffrey 61 MG Room Conveyors.
- 2—G.E.W. Elevating Conveyors.
- 2—G.E.W. 15" Room Conveyors, 300 ft.

- 4—Joy Ladel UN-17 Shakers.
- 10—Goodman G-12½ and G-13 Shakers.

## CONVERTERS AND DIESEL PLANTS

- 1—50KW G. E. TC-5, 275 volt Rotary Converter.
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- 1—150KW G. E. MCC-6's, 275 volt Rotary Converters.
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Complete steam plant, will sell all or any part.

Boilers, like new, 110 H. P. and 300 H. P. Also trans-

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Plants.

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- 10—Air Compressors, 1 H. P. to 40 H. P.
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- 15 Mine Cars, drop bottom, 42" Ga.
- 150 Mine Cars, 18" high, end dump, 44" Ga.
- 300 Mine Cars, end dump, 30" high, 48" Ga.
- 15—Brown Fayer H&L and W&D Car Spotters.
- 1—12 ton Differential Gate Lorry.
- 1—Kansas Hillside Dumps.
- 3—Low vein Water Cars.
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- 400 Electric Motors, 3 to 200 H. P.
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THE IRONTON ENGINE COMPANY  
FARMINGDALE, NEW JERSEY  
(Formerly Ironton, Ohio, 1902-1908)

## COAL CRUSHERS

- 1—24" x 24" Jeffrey Single Roll
- 1—30" x 30" Jeffrey Single Roll

## ELECTRIC HOISTS

- 1—11 HP Vulcan, single drum
- 1—20 HP Vulcan, single drum
- 1—22 HP Vulcan, double drum
- 1—25 HP Vulcan, single drum
- 1—30 HP Vulcan, single drum
- 1—37 HP single drum
- 5—50 HP single drum
- 2—60 HP single drum
- 1—75 HP Vulcan Double Drum
- 3—100 HP Box single drum
- 1—112 HP Vulcan, single drum
- 1—150 HP Vulcan, single drum
- 2—125-200 HP Ottumwa single drum
- 1—250 HP Ottumwa single drum
- 1—400 HP Stearns-Roger, single drum

## BATTERY LOCOMOTIVES

- 3—3½-4 ton Mancha, 24" ga.
- 1—4 ton Westinghouse, 24" ga.
- 1—4 ton Ironton, 36" ga.
- 2—6 ton General Electric, 36" ga.
- 2—7 ton General Electric, 36" ga.
- 1—7 ton Atlas—36" ga.
- 3—8 ton Ironton, 36" ga.
- 2—8 ton General Electric, 36" ga.
- 2—8 ton Goodman, 36" ga.
- 4—10 ton Atlas, 36" ga.

## TROLLEY LOCOMOTIVES

- 2—10 T. Jeffrey, 42" ga.
- 1—13 T. Goodman, 42" ga.
- 1—13 T. Jeffrey, 42" ga.
- 1—15 T. Jeffrey, 42" ga.

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- 1—Joy model 60D3P, battery operated
- 7—Joy model 60D1, battery operated

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- 1—2H Jeffrey 42" aerodynamic fan
- 1—7" Jeffrey aerodynamic 2 stage fan

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# Parmanco

Model 51-55 Dual  
COAL DRILL



## TWO DRILLS IN ONE

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Working ahead of an 8-yard loading shovel in 4-ft. coal, speed is essential.

Traction, hydraulic and electrical system operated by 109 hp engine. Push button controls. Drills can be operated singly or in tandem.

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—completely automatic

Blast holes, as seen in the picture, are kept clean from cuttings dropping back down the hole. A dam is formed about each blast hole excluding casual surface water.

SEND FOR COMPLETE DETAILS

PARIS MANUFACTURING CO.  
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# GUNDLACH CRUSHERS

ACCURATE SIZING...  
ECONOMICALLY

What makes a crusher crush *ECONOMICALLY*?

#### ADJUSTMENT ASSEMBLY

Upper and lower rolls can be adjusted by a turn of hand wheel while Crusher is in operation. This easy adjustment feature gives operator a definite control of top size of the crushed product . . . between  $\frac{1}{4}$ " and 6" top size.

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The timing of the rolls on each stage is accomplished by means of this unique Gear Box, containing 2 drive gears and 2 idler gears, which are always in full mesh. All gears are steel, cut and hardened. Uses self-contained oil splash lubricating.

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The use of Timken opposed bearing units on roll shafts and precision ball bearings at other points keeps H.P. at an absolute minimum.

CRUSHER SHOWN WITH  
HOPPER AND END PLATE REMOVED

#### UPPER ROLLS

Heavy one-piece cast steel construction. Striking sides and surfaces hard-faced with self-hardening rod give added life and decrease maintenance cost.

#### LOWER ROLLS

Heavy cast steel construction. Each tooth and striking surface hard-faced with self-hardening rod. Pocket-Tooth design gives a negligible percentage of oversize and a minimum of fines.

#### ALIGNMENT ASSEMBLY

Alignment Assembly, interlocked with adjustment feature, keeps rolls parallel at all times, even upon admission of tramp iron or non-crushable material.

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## How a new **CAT\*** No. 12 can **STEP UP YOUR MINE'S EFFICIENCY 3 WAYS**

This new Caterpillar No. 12 Motor Grader maintains 16 miles of haul road and 'dozes truck spillage at the Hill-Trumbull Mine, Marble, Minn. It is owned by the Mesaba-Cliffs Iron Company and operated by the Cleveland-Cliffs Mining Company of Cleveland, Ohio. In building and maintaining haul roads for faster cycle times and reduced wear and tear on equipment, in 'dozing and clean-up work, the new Caterpillar No. 12 does a big and important job. Here is how it can do it at lower cost in *your* mine:

**1. LOWER OPERATING COST.** The new No. 12 delivers its 115 HP on non-premium, low-cost fuels. Its new oil clutch gives you longer clutch life, easier operation, and as much as 1500 hours between clutch adjustments. Tubeless tires (furnished at no extra cost) run cooler, last longer, and eliminate the tube and flap down time of old-fashioned tires.

**2. LONGER WORK LIFE.** Like all Caterpillar Motor Graders, the No. 12 is built—not just assembled—by a single manufacturer. This means traditionally sound Caterpillar ruggedness and workmanship, and careful balancing of engine and blade capacity for long life

and high efficiency. And it means a single source for parts and service—your reliable Caterpillar Dealer.

**3. INCREASED PRODUCTION.** Positive, non-creep controls, easy "feel-of-the-road" steering, sure-footed traction with engine positioned over the driving wheels, quick-change blade positioning, unobstructed visibility—all these are good reasons why operators *like* the Caterpillar No. 12 Motor Grader, and do more efficient work on any job.

Your Caterpillar Dealer will demonstrate these and other features of the fast-working, long-lasting No. 12 Motor Grader. See him for proof that the Cat No. 12 will do more work at less cost on *your* job than any other grader.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

# CATERPILLAR\*

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**99% OF ALL CAT MOTOR  
GRADERS EVER BUILT  
ARE STILL AT WORK**



## What does mine water do to USS NATIONAL\* Polyethylene PIPE?

Nothing. In spite of its ravenous corrosive properties, mine water has no effect on NATIONAL Polyethylene Pipe. That's why it's the perfect pipe for mine drainage systems. However, polyethylene pipe offers more than resistance to acids, alkalis, salts and other chemicals. It offers economy and speed of installation. Light and flexible, it unrolls like hose, turns corners, goes over and under obstructions, requires very few joints.

NATIONAL Polyethylene Pipe is tough. It takes rough handling without cracking, even at sub-zero temperatures. In fact, it stays tough and

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In addition to all the advantages it offers, NATIONAL Polyethylene Pipe is the *most economical* pipe that can be effectively used for mine drainage.

Manufactured from pure 100% "on grade" polyethylene raw material, NATIONAL Polyethylene Pipe is available in sizes from 1/2-inch to 6 inches in diameter, in a variety of wall thicknesses. For complete information, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.



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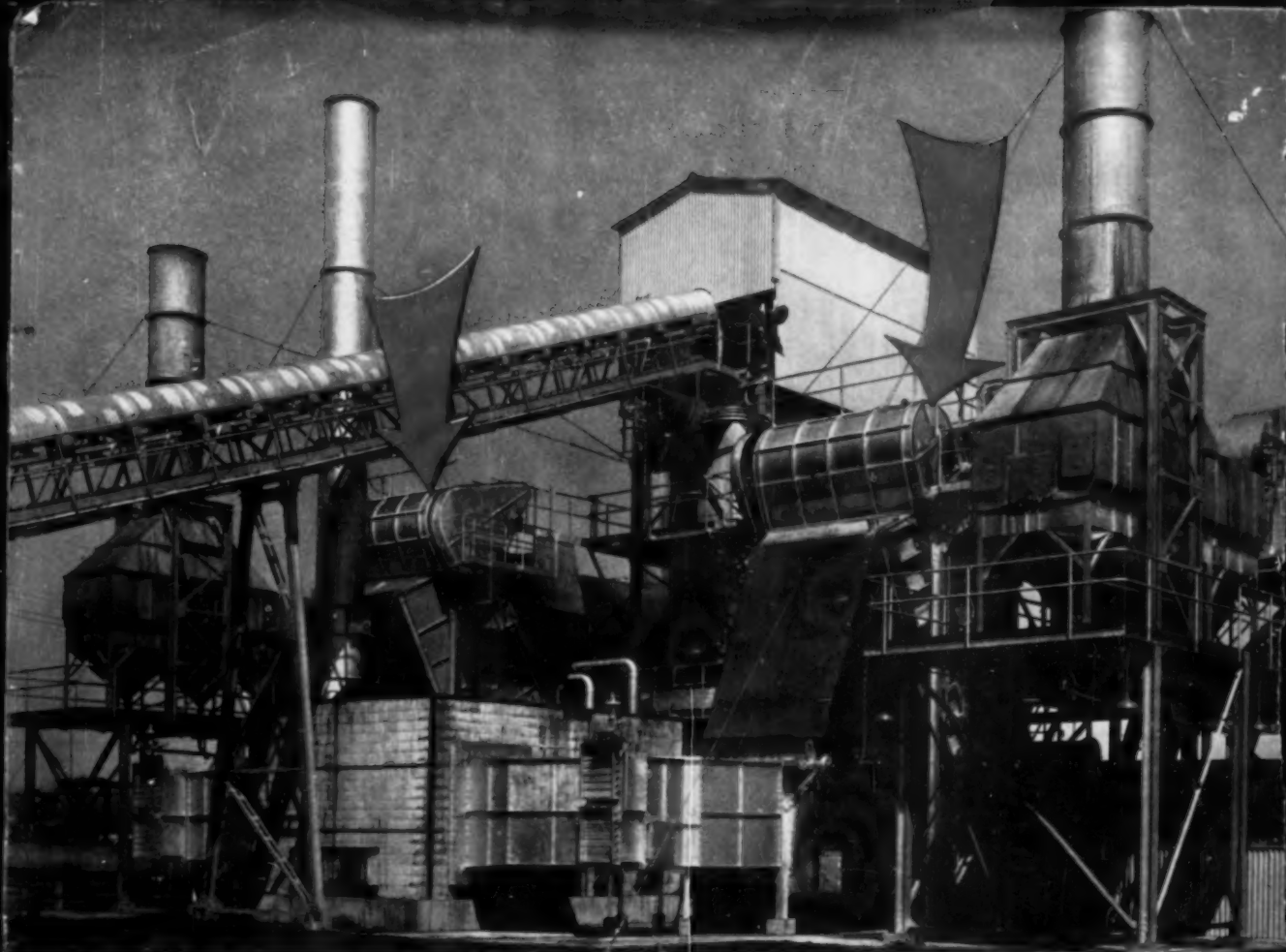


# NATIONAL Polyethylene PIPE

UNITED STATES STEEL

This seal of the National Sanitation Foundation  
is carried on all USS National Polyethylene Pipe  
and means—Tested... Approved... Sanitary!





View of large metallurgical coal cleaning plant shows two of three Link-Belt Multi-Louvre Dryers which provide low-cost moisture reduction.

**How LINK-BELT Multi-Louvre dries coal uniformly, gently with**

# LOWER TEMPERATURE AND LESS HORSEPOWER

**T**ODAY, more and more coal operators are switching to the Link-Belt Multi-Louvre dryer. The reason: they get a more marketable coal at lower cost per ton. Here's why:

#### LESS DUST AND DEGRADATION

Gentle action, plus accurate, automatic control, maintains size of your product whether it's 1½ inch or minus 28-mesh.

#### LOWER POWER REQUIREMENTS

Thanks to the reduced resistance to incoming air because of the coal's cascading action over the louvres, smaller exhaust fans can be used.

#### NO OXIDATION

Product temperatures of 100° to 120°F prevent oxidation of coal. This is particularly important when drying metallurgical coal.

#### GREATER SAFETY

Explosion hazards are minimized. Multi-Louvre's low air velocities reduce dust in the air stream.

For other reasons why Multi-Louvre Dryers are first choice among experienced operators, see the coal preparation specialist in the Link-Belt office in your field. Or write for copy of Book 2409.



**LINK-BELT**  
MULTI-LOUVRE DRYERS

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa).

14,262